June 11, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

TECHNOLOGY DEPT!

JUN 11 1945
DETROIT

"balanced proportions"

THE BASIC PRINCIPLES OF THE NEW TIMKEN ROLL NECK BEARING

This new Timken Roll Neck Bearing embodies design principles that have been tried and proved by millions of Timken Bearing applications in many different types of mechanical equipment and now are demonstrating their value in roll neck bearings.

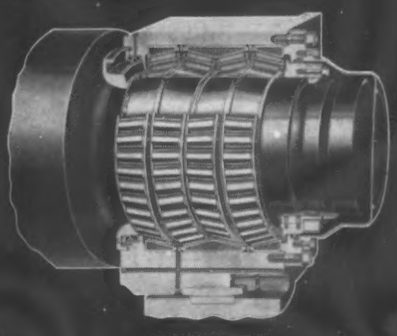
We call this new principle "BALANCED PROPORTIONS". Its development involved a careful study of cone and cup angles; roll diameter to roll length proportions; and other factors.

In BALANCED PROPORTION Bearings the ratio of roll diameter to roll length has been entirely changed and a balance made between bearing bore, width and rating for a given bearing outside diameter. Greater mill separating force capacity is obtained without any sacrifice of neck strength. "BALANCED PROPORTIONS" give a considerable increase in bearing bore for a given bearing outside diameter. Thus larger diameter roll necks can be used and neck stresses are greatly reduced under average load conditions at normal mill speeds.

"BALANCED PROPORTIONS" for mill bearing result in exactly the same neck stress in any size bearings of the new series carrying its given rated load.

We will be glad to work with your mill manufacturer in applying this new bearing with its many important advantages to your new mills.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO



TIMKEN

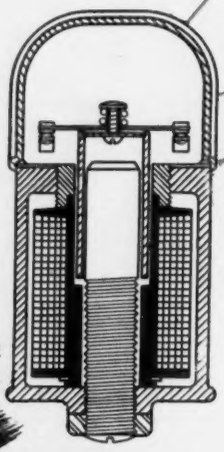
TRADE-MARK REG. U. S. PAT. OFF.

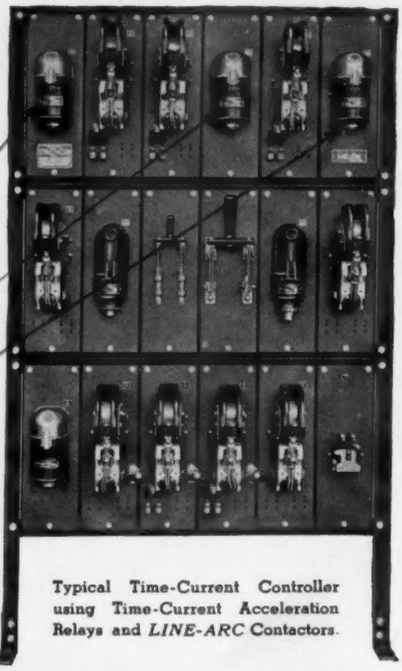
ROLL NECK BEARINGS

COPYRIGHT 1945 BY THE TIMKEN ROLLER BEARING CO.

EC&M

TIME-CURRENT CONTROL *Gives* Load-Controlled ACCELERATION!

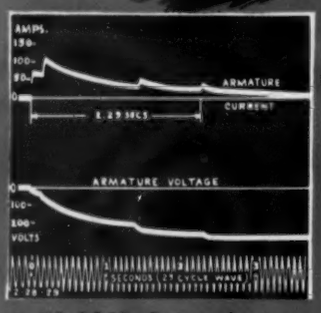




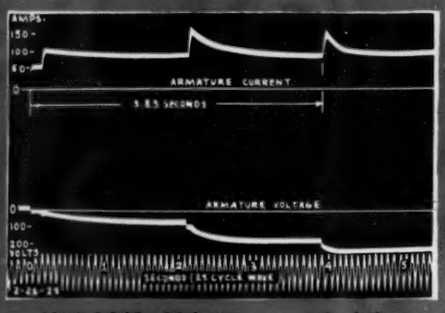
Typical Time-Current Controller using Time-Current Acceleration Relays and *LINE-ARC* Contactors.

Here's the **PROOF** *of Automatic Proportioning*

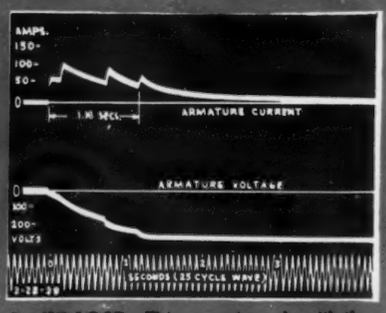
--MANUALLY ADJUSTABLE, TOO . . .



1. NO LOAD—Fast acceleration—2.29 seconds on light loads. Acceleration relays set for their maximum time adjustment.



2. 100% LOAD—With an increase in load, the time interval per step increases, giving the motor a chance to accelerate without tripping out the overload relays. Same acceleration relay adjustment as in Curve No. 1.



3. NO LOAD—This curve is made with the same load conditions as in Curve No. 1, but with the acceleration relays set for faster operation, reducing the time of acceleration from 2.29 seconds to 1.18 seconds. Faster operation than this is easily obtained by further movement of the adjusting plug.

The EC&M Time-Current Control automatically proportions the time-per-step according to the load, accelerating the motor in the shortest, safe time.

It is not a compromise for the ideal operating condition, but instead automatically adjusts itself to the load requirements. The advantages of such operation are—(1) fast acceleration of light loads, (2) longer time on heavier loads, (3) forced acceleration on abnormal loads.

These advantages result in improved operation due to less strain on motors and machines, ability to turn out greater production—better performance by operators since they quickly master the lightning response of these relays in taking the swing out of a crane hook, and similar light load conditions.

For your Direct Current Drives, ask for Bulletin 921 (Crane) and Bulletin 925 (Mill Auxiliary) Control. These descriptive bulletins will be gladly sent on request.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 East 79th Street Cleveland 4, Ohio

Which Steels for Induction Hardening?

We are frequently asked to recommend steels suitable for treating by the induction-hardening process. In considering this question, it is necessary to bear in mind the following:

Conventional steels hardened by the induction method may, under certain circumstances, exhibit greater surface-hardness values than would be anticipated with the usual types of heat-treating. As a result, adjustments in composition may be indicated to meet designated end physicals.

Moreover, shallow- and deep-hardening characteristics, metallographic structure, and machineability frequently enter the picture. It can be seen, therefore, that recommendations of specific analyses can be made only after a thorough study of the proposed application.

If you are using or are considering the use of induction-hardening equipment, it is important to choose the types of steels most adaptable to this process. The experience of Bethlehem metallurgists is at your disposal, and they will be glad to help in the selection of steels that will do the best job.

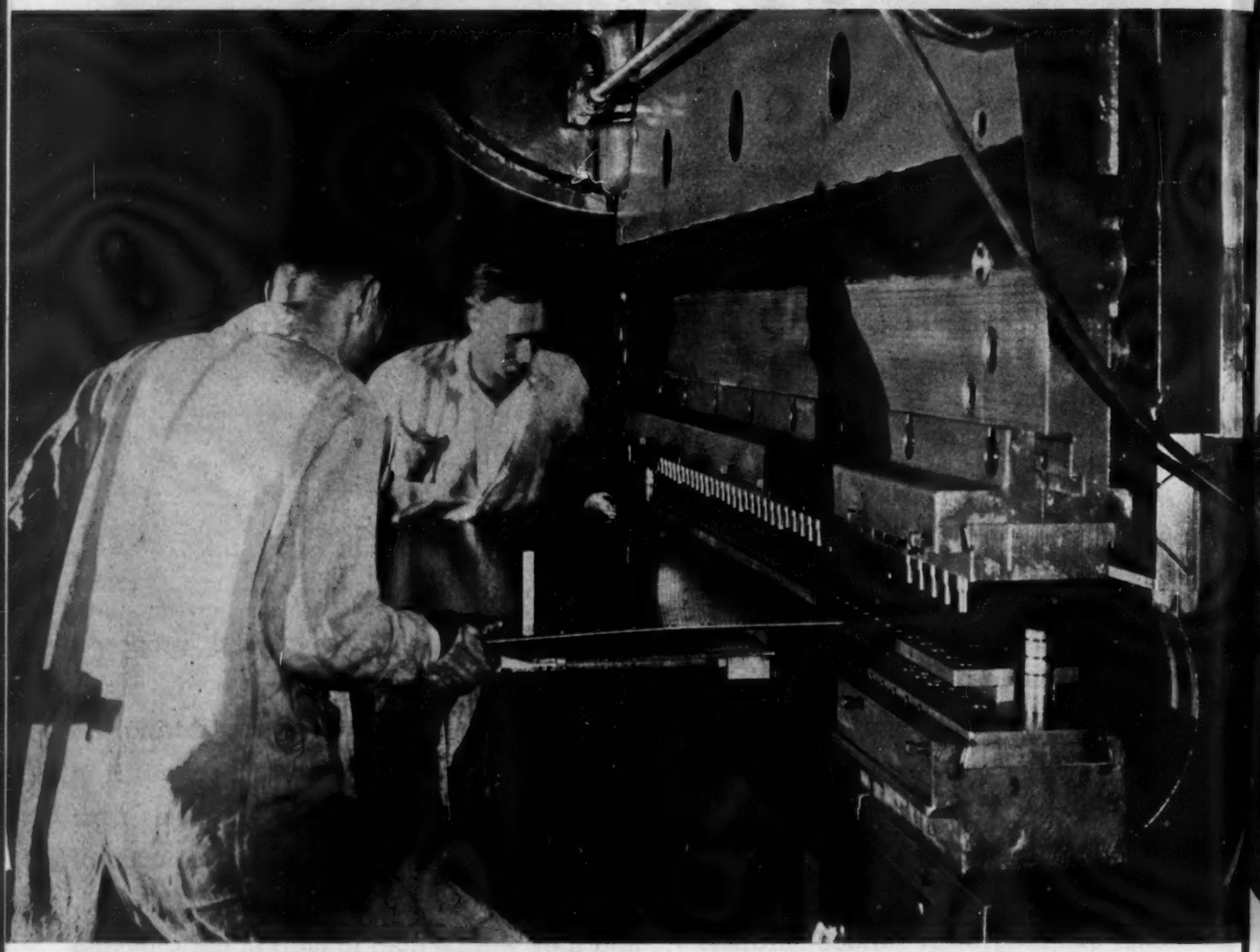
BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

Bethlehem Steel Export Corporation, New York City

★ ★ BETHLEHEM STEEL ★ ★

Punch it . . .

on a CINCINNATI PRESS BRAKE



Gang punching, as well as a great variety of forming, notching, combination notching and forming, trimming and punching . . . all are being done on Cincinnati Press Brakes.

Write for Catalog B-2, illustrating the possibilities of a Cincinnati Press Brake in your shop. Consult our Engineering Department on your punching and forming problems.

THE CINCINNATI SHAPER CO.

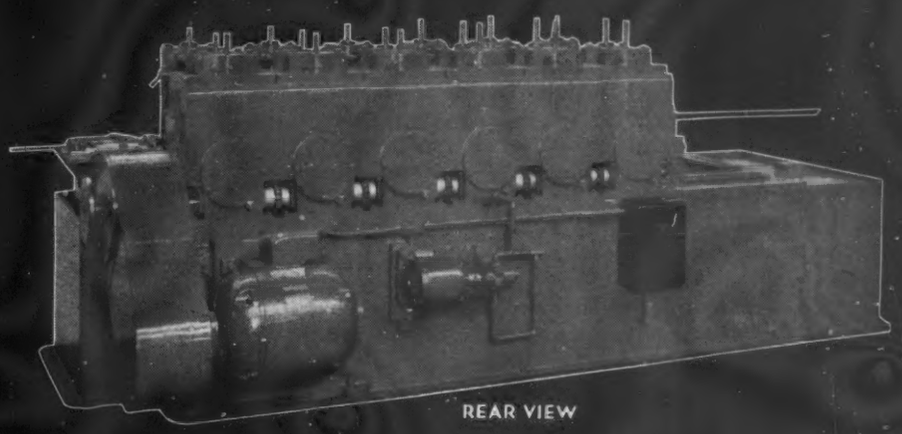
CINCINNATI OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

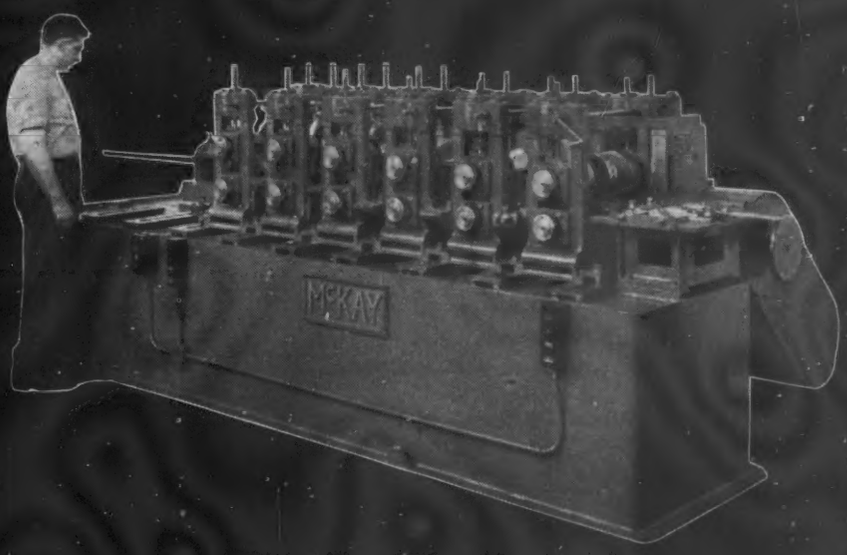
McKAY

ROLL FORMING MACHINES FOR PRODUCING SHAPES FROM FLAT STRIP

There's a McKAY Machine to Make Every Section



REAR VIEW



McKAY MICROMETER (patented)

STANDARD FEATURES

MICROMETER ADJUSTMENT. All pressure-points on top shaft controlled by simple crank motion; through worm and gear reduction. Top shaft is ALWAYS PARALLEL. Micrometer dial furnishes visible check on roll pressures.

TYPICAL RUGGED McKAY CONSTRUCTION. Standardized units; choice of gearing, anti-friction bearings throughout, all gears between bearings, NOT OVERHUNG.

INTERCHANGEABLE GUIDING EQUIPMENT. easily adjusted, quickly removable.

MINIMUM CHANGEOVER TIME. All units engineered to allow complete roll change in shortest possible time.

LOW MAINTENANCE COST. All of the foregoing features, plus precision workmanship and up to the minute engineering, are a guarantee of low maintenance.

OPTIONAL FEATURES

BASE EXTENSION. Permits increasing the number of roll passes to meet future requirements, by the addition of standard housing units at a later date.

MOTOR DRIVEN COOLANT PUMP. Supplies flushing fluid to the rolls at each roll pass, and provides a rust preventative treatment to the formed strip. Tanks for fluid are built integral with the welded steel base.

ENGINEERS AND MANUFACTURERS OF
TUBE MILLS
USING
ECTRIC RESISTANCE WELD
OXY-ACETYLENE WELD
OMIC HYDROGEN WELD

The McKAY MACHINE Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

PERFORMANCE RUGGEDNESS PRECISION AND SAFETY.

BEHIND THE SCENES

Tenth Anniversary!

■ You will probably be as surprised as we were to find that with this very issue we are celebrating a 10th anniversary! In a half-page grudgingly tucked into the market section of the June 10, 1935 issue this alleged column saw the light of day, and—we'll beat you to it—has been half-blind ever since.

But if you think this dribble is corny, now, just grab onto that chair and see what you could get away with back in the good old depression days. Here's the way we greeted our awaiting public:

> Before anyone tries to pin us down as to why we're here, we state our reasons once and for all:
>
> **STEEL'S happy (?) family of readers totals over 50,000** (Note: Now something over 75,000). **They deserve to know what is going on not only in their industry but in their industry's paper, which is STEEL, of course. That will be our job—to show you behind the scenes each week—to let you enjoy our laughs, share our troubles and help wrestle with our problems.**
>
> We should have a lot of fun together. Although somewhat limited in space we shall try to air any of your kicks or comments and try to be a combination safety valve, mail bag, private detective, dopester (*Note: Could well have said "dope"*), and perhaps in our own inimitable way—a humorist. (*Note: My gawd, why didn't they kill the whole deal right then and there!*)

Still Going Strong

■ We'll certainly not murder you with that entire first effort, but there was another item on down the line which could just as easily be written today:

> It seems we'll soon have to order more filing cabinets to hold the letters received commending "Mirrors of Motordom." The latest one, from the president of a large radiator company reads:
>
> **I enjoy reading STEEL very much and there is one page I read religiously—that is "Mirrors of motordom".**
>
> In the same mail a well-known V. P. tells us:
>
> **I have noticed for some time that "Mirrors of Motordom" has about the most accurate information available on the automotive industry.**
>
> That's swell, but what we would like to know, Mr. V. P., is why the "about"? Why not go the whole hog like one of our New York admirers who congratulates us for "the most outstanding magazine feature of its kind in the country"?

And the funny thing about it is that "Mirrors" still stacks up as the hottest feature in the industrial press, with Art Allen currently giving you the inside dope on the swing back to partial peacetime production.

Prophecying The Future

■ Incidentally, here was the last paragraph of "Mirrors" in that June 10, 1935 issue:

> **The recent talk, quickly hushed, about constructing air bases as protection against a possible enemy invasion via Canada called attention to the fact that 90 per cent of this country's automobile-manufacturing capacity is virtually at the border. Airplane engine manufacture, centered at Hartford, Conn. and Paterson, N. J. obviously is equally near the Atlantic coast. Detroit groans every time it recollects that despite all the progress it has made in internal combustion engineering, it has not been able to corral the airplane business! (The exclamation point is as of 1945).**

Good Old Depression Days

■ That same week in the summer of 1935, the American Iron and Steel Institute had just met in New York and voted to maintain the fair trade practices, minimum wages and maximum hours and to protect employe's rights of collective bargaining prescribed in the defunct NRA steel code. Government was grudgingly relinquishing its control of business via NRA and practically daring industry to recover on its own. Steel production had worked its way back up to over 40 per cent of capacity, over 400,000 cars were being turned out each month, West Point cadets were taking an inspection trip through Ludlum Steel Co. at Watervliet, and the Wagner Bill was being argued in Congress. Plans were well underway for the national Machine Tool show to be held in Cleveland, in September, and STEEL was running a series of articles by leaders in the machine tool industry on the need for modernization of capital equipment. STEEL's classified columns had a long list of "Positions Wanted" advertisements but not a single "Help Wanted" listing. It was reported that Japan was experiencing some contraction in business and scrapped many of her cargo ships, and STEEL's composite on finished steel prices was only $3.55 under today's market.

In those times we were born.

No Tanks

■ Another little item ran like this:

> One of our friends, who makes wooden tanks for pickling, has apparently tired of waiting to round the "corner."
>
> With orders few and far between he has turned to the bootleggers and is doing a lively cash-and-carry business. Despite the FACA, G-men and other handicaps, the 'leggers still buy his tanks with cash on the line and, what with raids 'n' things, they don't last very long—necessitating more tanks and more cash.
>
> Where there's a still there's a way!

Rechristening

■ And just to close off this anniversary celebration, we'd like to rechristen ourselves if it's all right with all concerned.

Back in those good old days we had a name, which looked unpronounceable but actually rolls off your tongue nicely once you try it. It's arrived at by the linotyper by simply letting his finger run down the first column of keys which, we must admit, gives us sort of a mechanical conception, but perhaps that's perfectly all right on an industrial magazine.

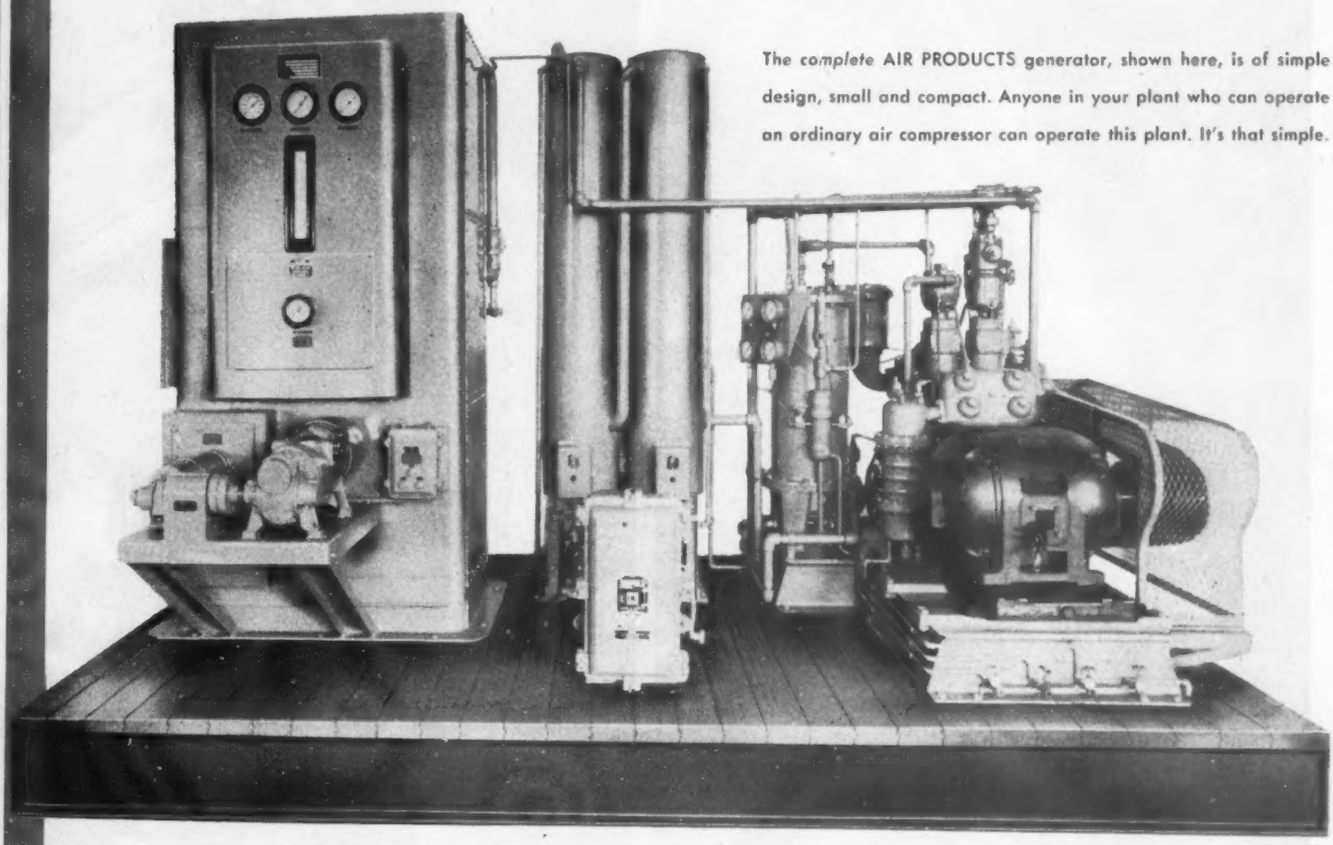
At any rate, from now on just step right up and call us—

—SHRDLU

Vol. 116, No. 24, June 11, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 85

Making Your Own OXYGEN is as Simple as making Steam



The *complete* AIR PRODUCTS generator, shown here, is of simple design, small and compact. Anyone in your plant who can operate an ordinary air compressor can operate this plant. It's that simple.

There is nothing complicated about making your own oxygen right in your own plant — in fact, it is just as simple as making your own steam. And you can save up to 50 per cent of your oxygen costs with an efficient, compact AIR PRODUCTS generator. Thoroughly tested and proven in war service, the new revolutionary AIR PRODUCTS generators have earned an important place in progressive peacetime industries.

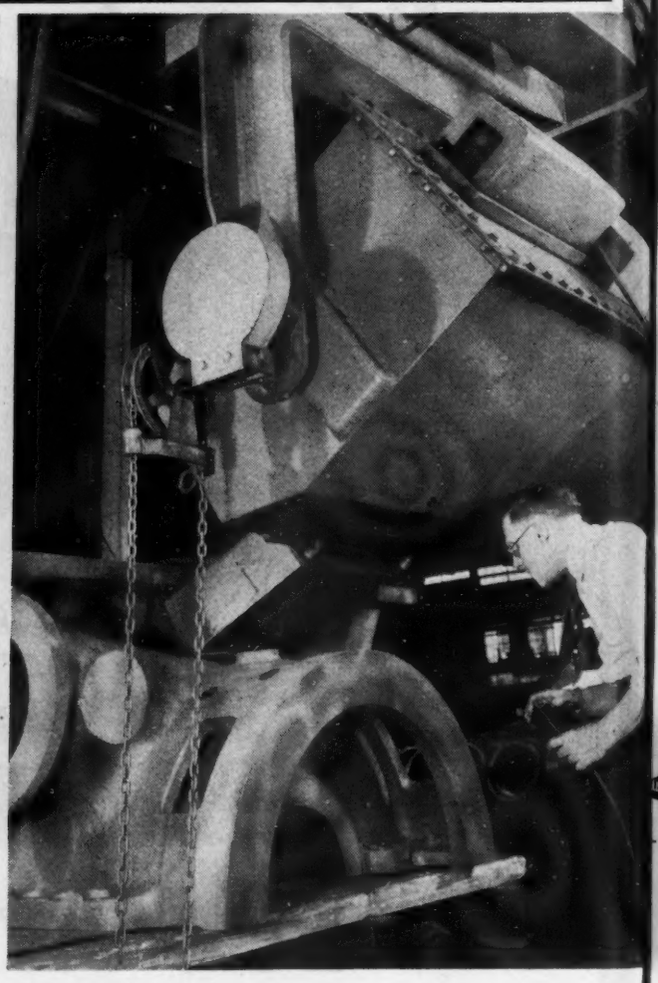
Our engineers will welcome the opportunity to show you how you can cut costs and increase efficiency by using improved AIR PRODUCTS plants for producing oxygen, nitrogen and other gases from atmospheric air. Write for more specific details.

Air Products INCORPORATED

Manufacturers Road, Chattanooga 5, Tenn.

ALLIS-CHALMERS ELECTRODES HAVE GOT TO BE GOOD!

BECAUSE: 1) We use them *ourselves* — tons of them a day... 2) We constantly check weld metal by X-Ray, tensile machine, metallographic microscope, etc. — to be *sure* A-C electrodes are coming through right.



1 Builders of the greatest variety of capital goods in the world, Allis-Chalmers is also one of the world's largest *users* of welding equipment. Thus we ourselves use Allis-Chalmers electrodes for practically *every* type and size of welding job known to industry. In one A-C shop alone over one and a half tons of arc welding electrodes are used every day. That means Allis-Chalmers electrodes are being continually tested *in production*—under *all* welding conditions.

2 Soundness of weld is determined by modern research equipment such as the above giant 400,000 v X-Ray machine—being maneuvered into position to "shoot" part of a high pressure turbine. This positive, non-destructive method of weld examination provides a *direct* check on electrode performance. Yes, Allis-Chalmers electrodes have *got* to be good! You can get them at our nearby district office or welder dealer. Send for bulletin B6340. A 1808

ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A-C Electrodes
EASY TO REMEMBER
EASY TO BUY
Sold by AWS Number

HEADQUARTERS FOR WELDING EQUIPMENT

AMPAC A-C WELDERS

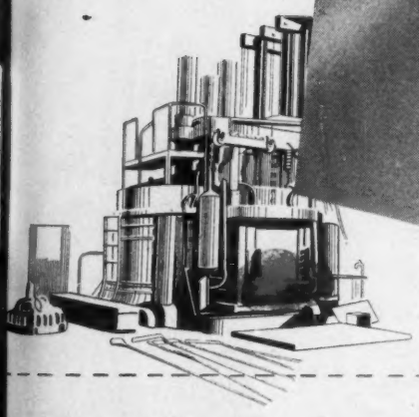
WELD-O-TRON D-C WELDERS

ARC WELDING ACCESSORIES

Quicker Delivery

JESSOP

STAINLESS STEELS



In All Analyses for:

Corrosion Resistance
Heat Resistance
High Strength

Bars · Billets · Shapes · Sheets · Plates
Free Machining Bars · Hot Rolled · Centerless Ground

★ ★ ★

WAREHOUSES: CHICAGO · CINCINNATI
CLEVELAND · DETROIT · HARTFORD · TORONTO

Jessop Steel Company

Head Office and Works: Washington, Pa.

ARMY NAVY JESSOP STEELS

Established 1901

HOW CAN 8 3/4 HOURS CONSTITUTE AN 8 HOUR SHIFT?

That's easy. Just switch to faster cutting ELECTRO Grinding Wheels. Get at least 10% greater cutting effectiveness.

Reduce the fatigue factors. Fast-cutting ELECTRO Grinding Wheels do not try the patience of operators. Their great strength and rugged construction, command confidence.

ELECTRO Grinding Wheels work smoothly and easily without "nursing." They vibrate less and cut cooler.

This faster cutting and these fatigue reducing factors, lift morale, renew enthusiasm. A 10% gain in the *effectiveness* of cutting time, is a *reasonable* expectation.

Why not phone us now?—and let us send an ELECTRO Engineer to prove it? Our number is WAshington 5259, Buffalo, N. Y.

K-306

Electro TRADE MARK SINCE 1919

Electro REFRACTORIES & ALLOYS CORPORATION

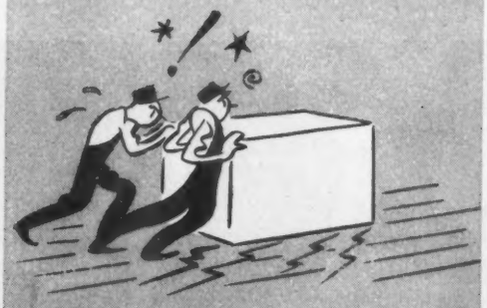
MFRS. • CRUCIBLES • REFRACTORIES • STOPPERS • ALLOYS • GRINDING WHEELS

144 DELAWARE AVENUE *Established 1919* BUFFALO 2, NEW YORK

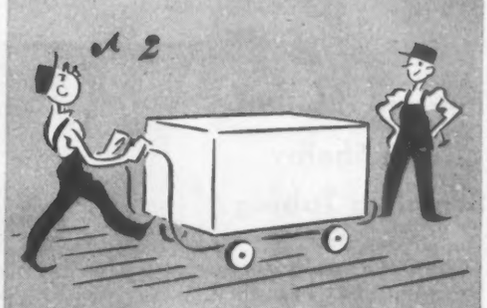
FIGHT FRICTION!

It's Electric Motor Enemy No. 4...

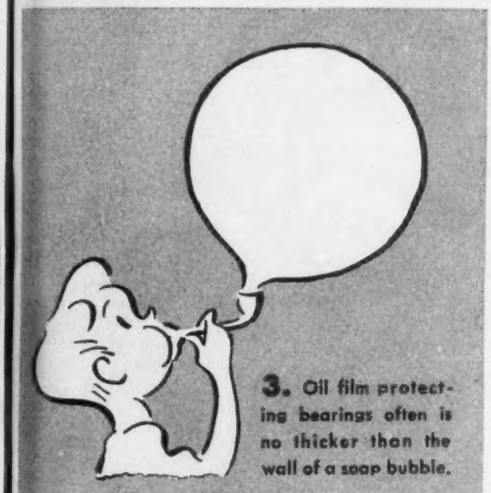
In Allis-Chalmers' new "Guide to Wartime Care of Electric Motors".



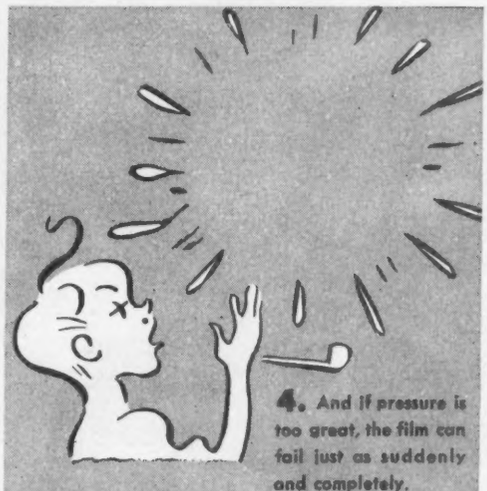
1. Like a motor without oil. Simple! Yet every day hundreds of workers overlook the importance of adequate motor lubrication.



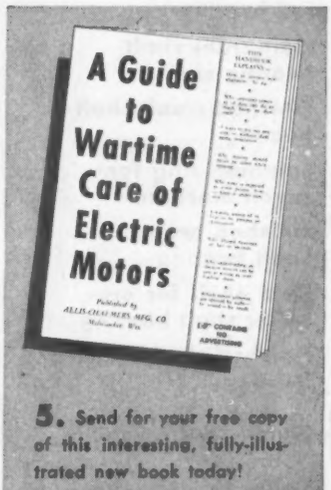
2. Like a motor with oil. Pictures like these make motor maintenance easy to put across in training new employees.



3. Oil film protecting bearings often is no thicker than the wall of a soap bubble.



4. And if pressure is too great, the film can fail just as suddenly and completely.



5. Send for your free copy of this interesting, fully-illustrated new book today!

ONE OF A MOTOR'S most dangerous enemies is friction. In peacetime, instructions for guarding against it were based on 8-hour-day, 6-day-week operation. Today, with motors working up to *3 and 4 times* as many hours a week, those instructions are dangerously obsolete!

To help put U. S. motor maintenance on an efficient wartime footing, Allis-Chalmers has published "Guide to Wartime Care of Electric Motors". This valuable book explains the *9 main enemies* of electric motors . . . tells you how to fight them. Its recommendations are simple and practical . . . ideal for training new men or as a review for experienced men. Book is fully illustrated with stimulating, understandable sketches like those shown above—*contains no advertising.* Over 100,000 copies in use by industry and armed forces. Send for your *free* copy today! ALLIS-CHALMERS MFG. CO., MILWAUKEE 1, WIS.

A 1658

ALLIS-CHALMERS MOTORS

When you do need new motors, look into the strength, solidity and all-around protection of the new "Safety Circle"—protected top, sides, ends and bottom.

AC WE WORK FOR VICTORY WE PLAN FOR PEACE

DO YOU MAKE ANY

They are all made from Shelby Seamless Tubing

1. Contact Coupler for searchlight truck
2. Top roller for half-track
3. Bogie wheel hub
4. Impeller
5. Winder cam for textile machine
6. Finished connecting rod bearing
7. Main crank shaft bearing shell
8. Finished crank shaft bearing
9. Spinning ring for rayon machine
10. Finished propeller shaft bearing
11. Steel shell for propeller shaft bearing
12. Finished steel-bronze bearing
13. } Clutch-bearing shells
14. }
15. Roller for conveyor
16. Spacer for bearings
17. Bearing shell
18. Airplane engine suspension cylinder
19. } Finished bearings
20. }
21. } Cartridge receivers for small arms
22. }
23. }
24. Airplane engine suspension, steel-rubber-steel
25. Finished clutch bearings

NATIONAL TUBE COMPANY
USS STEEL
UNITED STATES STEEL

UNITED STATES STEEL

PARTS LIKE THESE ?

SEAMLESS STEEL TUBING will help

1. *Speed up production*
2. *Make a better product*
3. *Save money, time and steel*

THESE parts have one characteristic in common—they have all been designed to utilize the basic advantages of seamless steel tubing. Many of them were previously made by forging or by machining from solid stock.

Such methods were comparatively slow and wasted a considerable amount of valuable metal. Often the percentage of rejects was alarmingly high.

By skillful redesign, starting with an accurately made seamless tube, production in many cases has been doubled and even tripled. Man and machine time have been cut to the core. Finished parts are more uniform, and, in some cases, rejects have been reduced to zero.

It is easy to see how these faster, better methods will trim off unnecessary costs. Savings as high as 50% are not uncommon.

When you are redesigning your products, let us show you what you can do with SHELBY Seamless Mechanical Tubing to save money, save materials and get a better product. Blueprints or sketches of your design will be carefully examined and suggestions made without obligation.

NATIONAL TUBE COMPANY

Pittsburgh, Pa.

Columbia Steel Company, San Francisco,
Pacific Coast Distributors

United States Steel Export Company, New York

SHELBY SEAMLESS *Steel Tubing*

"Producing work of high quality and caliber...we are well pleased with its performance."

VERSON ALLSTEEL PRESS CO.

CHICAGO, ILLINOIS

Because Verson Presses and Brakes are custom-made, lathe work varies widely in size and physical properties. Verson finds their new Lodge & Shipley 20" Engine Lathe highly adaptable, easily operated—and because all moving parts are fully enclosed, a very safe lathe to handle.

LODGE & SHIPLEY LATHES at work

THE satisfaction here expressed by Climax and Verson is typical of the reaction of Lodge and Shipley Lathe users in shops of every size and type. It is satisfaction of this kind which has gained for Lodge and Shipley world wide recognition for superior lathe performance. You, too, will find it profitable to call L & S Engineers.

Write for bulletins, Numbers 500, 503, and 605, giving complete details of L & S Engine Lathes from 14" to 22".

"Doing a variety of turning and threading jobs... these lathes are favorites of our operators."

CLIMAX ENGINEERING CO.

CLINTON, IOWA

Running two busy shifts per day, Lodge and Shipley 14" Engine Lathes turn tank shafts, also various parts for the well-known Climax Gas and Diesel Engines and Generating Sets.

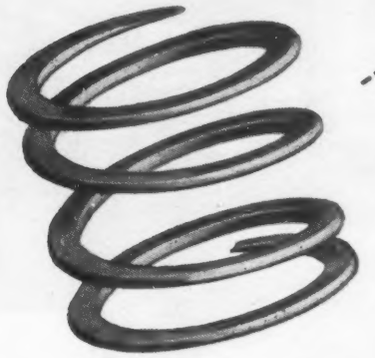
THE LODGE & SHIPLEY MACHINE TOOL CO.

CINCINNATI 25, OHIO, U. S. A.

L & S LATHES

ENGINE—TOOL ROOM—AUTOMATIC—OIL COUNTRY LATHES

Measure of a good spring

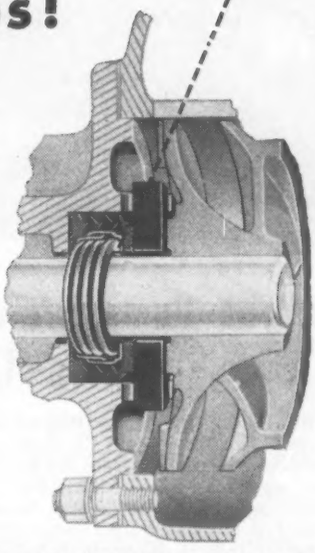


—is the company it keeps!

Schwitzer-Cummins is another great name on the long list of Muehlhausen customers. Muehlhausen Springs are one of the quality parts contributing to the famous reputation of this Company's products.

The use of the right spring is vital to sustain the reputation of any company's products. This is necessary today in supplying superior equipment for our tanks, trucks, planes, ships, tractors. It will be particularly true tomorrow in peace-time applications.

MUEHLHAUSEN SPRING CORPORATION
(Division of Standard Steel Spring Company)
921 Michigan Avenue, Logansport, Indiana



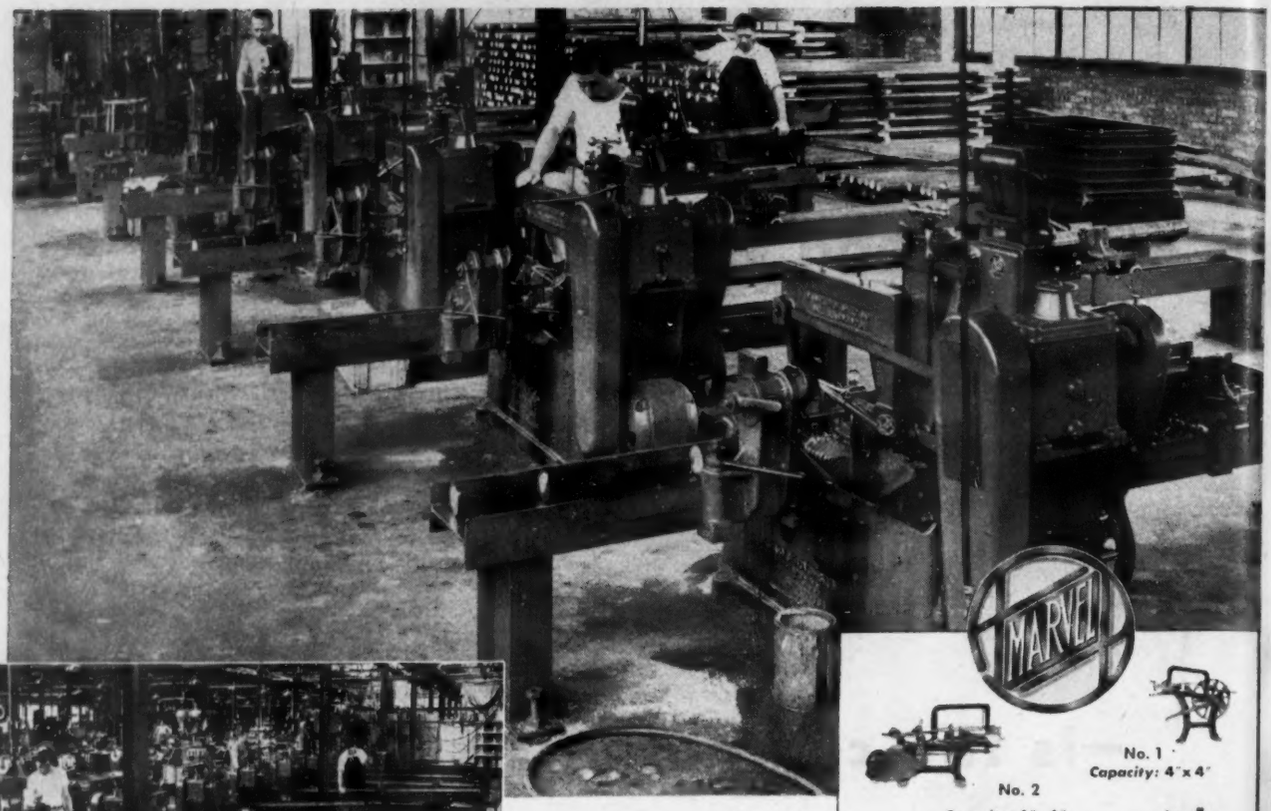
SCHWITZER-CUMMINS AQUA-TITE SEAL

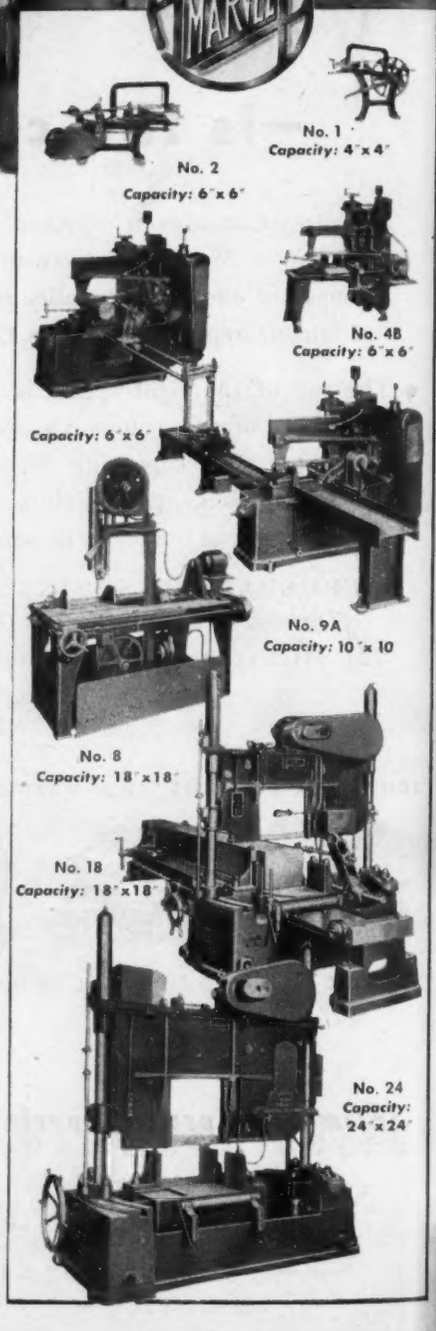
SCHWITZER-CUMMINS AND MUEHLHAUSEN ADD QUALITY

TO SCORES OF WELL-KNOWN PRODUCTS!

Four million Aqua-Tite Seals in one year is the record of Schwitzer-Cummins. That's a lot of seals, and such production called for a multitude of specially designed Muehlhausen Springs. Such large volume indicates the satisfactory performance of this spring-designed seal on heavy-duty trucks, tanks, combat cars, amphibious vehicles.

To improve product performance, use MUEHLHAUSEN Designed SPRINGS





Wayne Pump has a modern "automatic" cutting-off department

Here is an efficient cutting-off department—a battery of nine high-speed No. 9A MARVEL Automatic Bar Feed Hack Saw Machines, which are supplied from an adjacent stock pile by an overhead monorail system. These MARVEL "Automatics" have been continuously cutting-off accurate lengths from 3 1/8" and 3 3/8" diameter bars (WD 4150 M hot rolled steel) since 1942. With only 3 operators this "automatic" cut-off department has been able to keep ahead of not only the Wayne's large ordnance contracts but their various subcontract jobs as well.

Under this continuous "pounding", at wartime speed, these "world's fastest" hack saws have proven "practically trouble free." Day in and day out for over three years they have continued to automatically feed, measure, and accurately cut-off endless numbers of pieces from single or nested bars, tubes and shapes with no more operator attention than is required by automatic screw machines.

MARVEL Automatic Production Saws come in two sizes, the No. 6A MARVEL, capacity 6" x 6", and the No. 9A MARVEL (pictured above) which has a capacity of 10" x 10". For larger size work the new MARVEL "Giant" Hydraulic Hack Saws (capacities 18" x 18" and 24" x 24") are the first choice because they easily handle the largest sizes and toughest steels.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 W. Bloomingdale Ave. Chicago 39, U. S. A.

Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

MARVEL SAWS

VITAL PARTS *must not fail...*

LADISH

CONTROLLED QUALITY

FORGINGS

Maximum physical properties . . . capable of withstanding the strains of heavy-duty service . . . are assured in Ladish Forgings by the exacting metallurgical controls which safeguard quality at every step in the forging procedure.

Improved designs and greater stamina in vital parts can be obtained by use of drop forgings.

Ladish engineers are available for consultation on your products.

DROP FORGINGS UP TO

2500 lbs.

ARMY E NAVY

TO MARK PROGRESS

LADISH DROP FORGE CO.

CUDAHY • WISCONSIN

MILWAUKEE SUBURB

Something to look forward to

As you formulate your plans for conversion to peacetime production, look to Peninsular for the newest advancements in the fabrication and application of abrasive wheels.

During four long years of expanded effort to meet the requirements of industry at war, Peninsular field and research engineers have constantly pressed their search for new materials — new methods — better ways to manufacture grinding wheels and apply them to the problems of production.

From this new wartime experience combined with the knowledge gained in nearly 60 years of pioneering, Peninsular promises you something to look forward to in the peacetime manufacturing days ahead.

A STANDING INVITATION

Our expert staff of factory and field engineers are ready today to help in your postwar preparation — with a production, engineering and cost analysis service beyond any offered up to now in the industry.

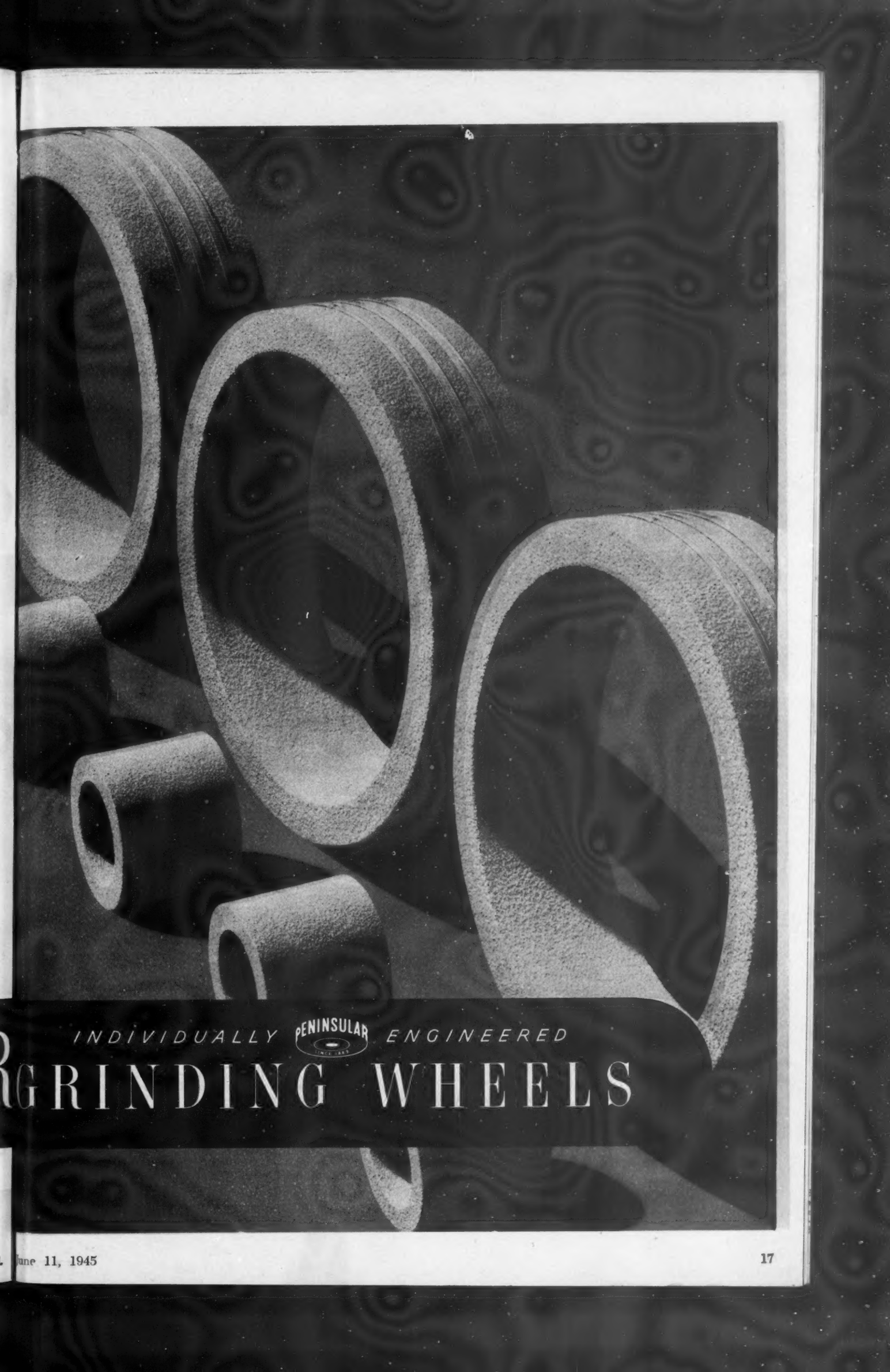
The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR GRINDING WHEELS

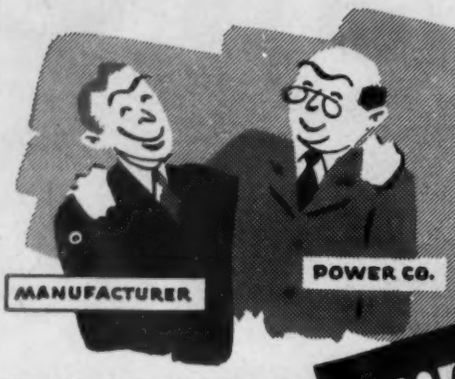
SINCE 1889

Cylinder wheels for various types of surface grinding


INDIVIDUALLY PENINSULAR ENGINEERED
GRINDING WHEELS

NOW. . . RESISTANCE WELDING AT

Near Unity Power Factor (less KVA)



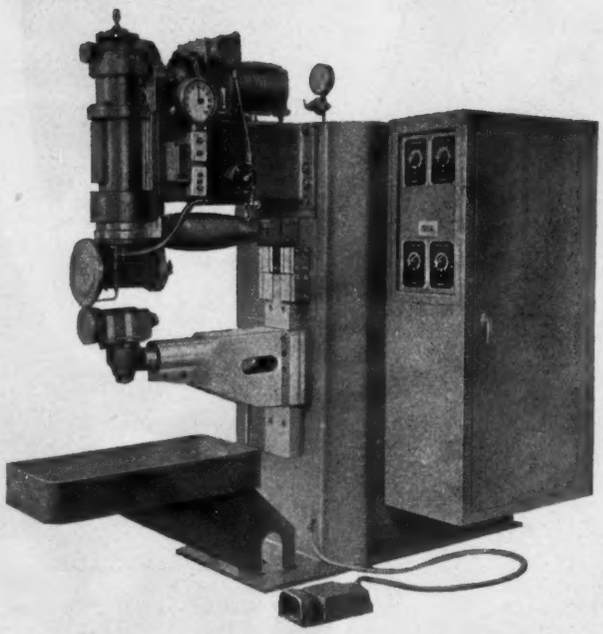
"THREE-PHASE"

Manufacturers and power companies have long been at odds over the problem of supplying power for heavy reactive loads. Particularly in the case of heavy duty resistance welding of steel, power suppliers have often found it necessary to place a ***demand charge*** on the manufacturer.

One reason for this is that conventional welders must utilize the comparatively high frequency alternating current in their secondary circuit. High frequencies mean high reactance, with resultant operation at very low power factor — often 25% or less. Low power factor means more current must be available to meet the same demand . . . often requiring a boost in the size of distribution facilities.

Sciaky "THREE-PHASE" welders are designed to overcome this, as well as other difficulties encountered in heavy duty resistance welding. An ideal low frequency current is produced at the electrode tips by an ingenious system of first, rectifying all three phases of the supply to d.c., then reconverting to an alternating impulse. Operation is on a ***balanced three phase load*** at ***near unity power factor.***

Bulletin 204-A describing fully the Sciaky "THREE-PHASE" principle will be gladly sent on request.



The Sciaky THREE-PHASE principle has been effectively applied to heavy gauge seam welding. The machine illustrated (type PMM.2T-13) welds steel up to two thicknesses of .109" and can achieve a speed of 84" per minute on two thicknesses of .040". Transformer rating is 120 KVA at 50% duty cycle. Unit is entirely self-contained with hinged side mounted rectifier and control cabinets. Electronic controls provide adjustable on-off time, squeeze and hold time.

SCIAKY BROS.

Complete line of AC and DC Electric Resistance Welding Machines

4915 West 67th Street, Chicago 38, Illinois

Offices in Detroit, Los Angeles, Washington, Cleveland and New York

Representatives in Principal Cities

In England: Sciaky Electric Welding Machines, Ltd., London

In France: Sciaky S.A., 13, 15 Rue Charles Fournier, Paris

the answer to greater production

LESS COST · LESS EFFORT · LESS MAN HOURS

HANSEN COUPLINGS

Hansen Push-Tite air hose couplings are "savers" on any production line. They save many steps in a day, much time and effort, and a considerable volume of air, which all adds up to greater production, less cost, and more profits. There is no shorter cut or better way to meet tomorrow's keen competition than to conserve and save all the way along the production line with Hansen Push-Tite air hose couplings. They're simple and easy to operate; slight push of plug into socket, it's connected, locked and air is automatically turned on. To disconnect, merely slide sleeve back with thumb, plug is ejected and air is automatically turned off instantly. No loss of time, air or effort, no twisting or turning to connect or disconnect.

You can't afford to be without Hansen couplings because they pay for themselves on savings and increased production.

There's a Hansen coupling made for air, oil, grease, gasoline, oxygen, and acetylene.

Our free industrial catalog is yours for the asking . . . send for it today.

Buy a War Bond and Keep It!

THE HANSEN MFG. CO.

1786 EAST 27th STREET
CLEVELAND 14, OHIO

25 Short Years...

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President

ART GILLMAN
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BILL HASSINK
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HAROLD JONES
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CY [illegible]NEIX
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C. F. FITZ[illegible]ALD
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Through the vicissitudes of prosperity and depression, peace and war, government regulation and material shortages, the Bissett Steel Company has served Middlewestern industry for a quarter of a century. Twenty-five years . . . but they have been short years, filled with the excitement of growing to meet the ever-increasing needs of steel users. They have been happy years, too, even when the going was rough, and now, on our twenty-fifth anniversary, we ask nothing more than the privilege of serving you faithfully throughout the years to come.

FOR IMMEDIATE DELIVERY

Carbon and Alloy Steels, H. R. and C. D. • Ball Bearing Steel • Aircraft Steels • Boiler Tubes • Chisels • Cold Finished Steels • Cumberland Ground Shafts • Drill Rod • High Speed Tool Bits • Shim Steel • Spring Steels • Tool Steels • Tool Steel Tubing • Welding Rod

MAIN OFFICE & WAREHOUSE
947 E. 67TH ST. • CLEVELAND
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the BISSETT steel company

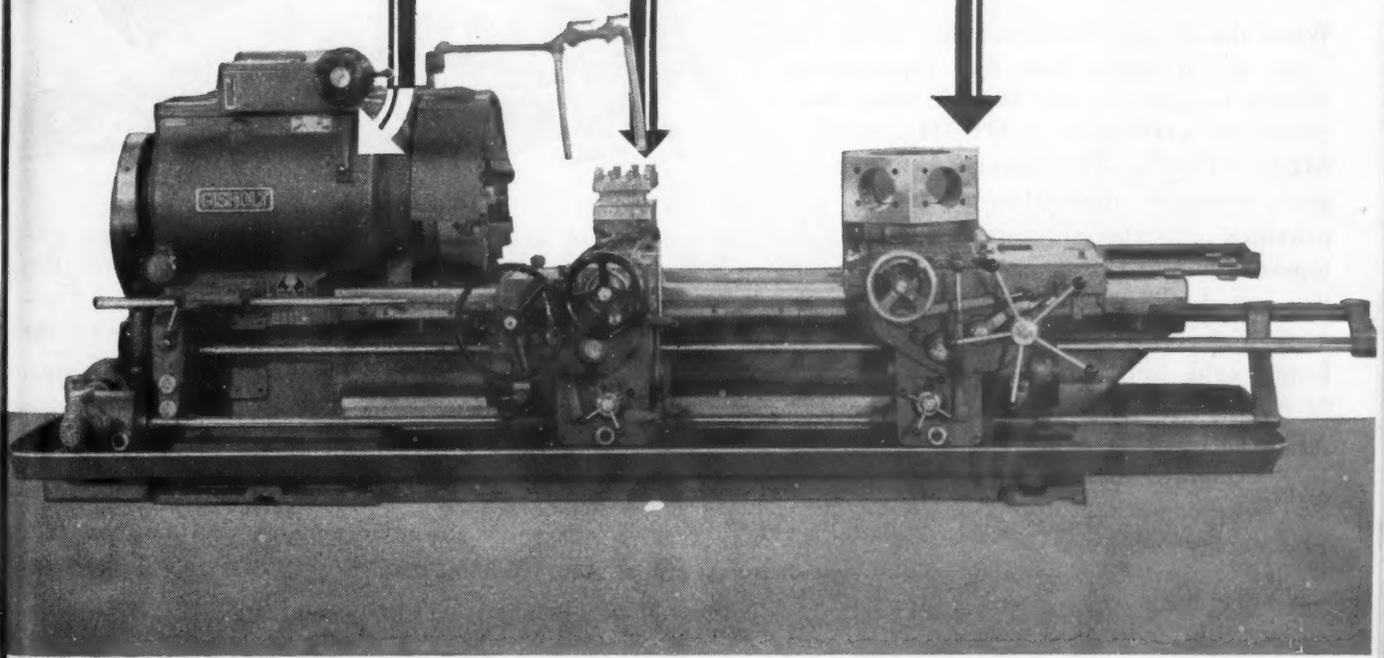
Adaptable . . .

Here's a Gisholt advantage that pays big dividends . . . the ability to handle a broader range of work when the need arises. Take, for example, the Gisholt 4L Saddle Type Turret Lathe. A big machine, to be sure, yet its flexibility and ease of operation enable it to handle smaller work too. Here are a few of the reasons why:

1 Hydraulic clutching and braking make it possible for the operator to start, reverse, or stop the spindle—as quickly and as effortlessly as on many smaller machines. One easy movement of one lever is all it takes. Response is instantaneous, smooth, positive.

2 Power rapid traverse for the side carriage is provided not only for longitudinal movement but also for in-and-out movement of the cross slide. Here's greater ease and speed for bringing tools quickly into cutting position.

3 This massive cross-feeding hexagon turret is more accurate—more adaptable with its 16 reversible feeds and automatic feed trips for both longitudinal and cross feeds. It can be locked rigidly on center for bar work—or chucking work with piloted tools.



Adaptability is a fact that applies to both Gisholt Saddle Type and Gisholt Ram Type Turret Lathes. Make the most of it. Explore the possibilities of each type to assure the most flexible and economical set-up for your own production. Ask for literature.

GISHOLT MACHINE COMPANY • *1217 E. Washington Ave., Madison 3, Wis.*

Look Ahead...Keep Ahead...With Gisholt Improvements in Metal Turning

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

IT CAN TAKE IT

When the Army's 155-mm. gun—"Long Tom"—lets go, it has a kick like forty mules. That's reason enough for building the carriage with N-A-X HIGH-TENSILE STEEL. The inherently finer grain structure of this low-alloy steel provides exceptional resistance to impact and fatigue, just as it insures unusual ductility for a metal of such high tensile strength. In bitter cold and tropic heat, N-A-X HIGH-TENSILE STEEL is "taking it" in this exacting application and in other military applications of all types.

IT CAN DISH IT OUT

There's a bonus of "extra yardage"—more earth moved each hour—when N-A-X HIGH-TENSILE STEEL is used for steam shovel buckets. Its great strength permits lighter, more efficient design. Its unusual resistance to wear and impact helps insure long life with low maintenance costs. And not least in importance, its exceptional weldability makes possible a welded construction that stands up under the heaviest punishment. Buckets made of N-A-X HIGH-TENSILE STEEL are "dishing it out" for the armed forces and for civilian contractors.

GREAT STEEL FROM GREAT LAKES

GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

ERIE OFFERS the most complete line of digging and rehandling buckets offered by any single manufacturer ★ Uncle Sam liked our bucket designs and ordered thousands for special digging jobs on all fronts ★ It will pay you to get an Erie Bucket for it will be made to fit your crane, material and cycle of operation ★ We have proved scores of times that an Erie bucket designed for the job will pay for itself in a predetermined period and then pay off in steady profit ★ Whatever you handle you can do it faster and easier with an Erie ★ Erie builds 10 types of buckets but sells predetermined bucket performance that must pay for the bucket ★

Write today for the complete details to

ERIE STEEL CONSTRUCTION CO.

956 GEIST ROAD ★ ERIE, PA.

ERIE

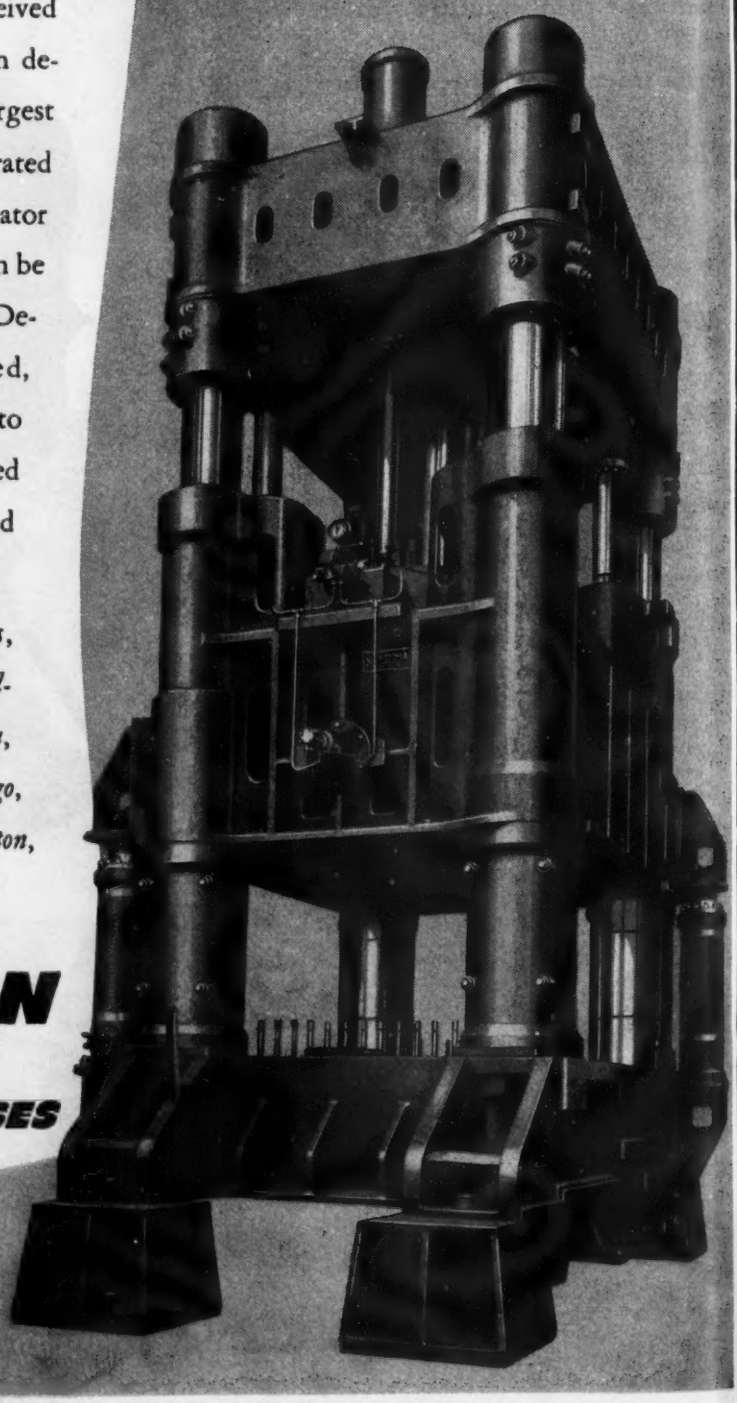
BUCKETS

AGGREMETERS ★ TRAVELING CRANES
PORTABLE CONCRETE PLANTS

LARGE FLANGING PRESS

The production of control panels and aluminum shapes for airplanes received an impetus recently when Baldwin delivered one of the country's largest double acting flanging presses. Operated from a hydraulic pump and accumulator system, the inner and outer slides can be controlled separately or as a unit. Depending on the operation involved, pressure can be exerted from 1900 to 3300 TONS. A hydraulically operated sliding table is provided to insert and remove the heavy dies.

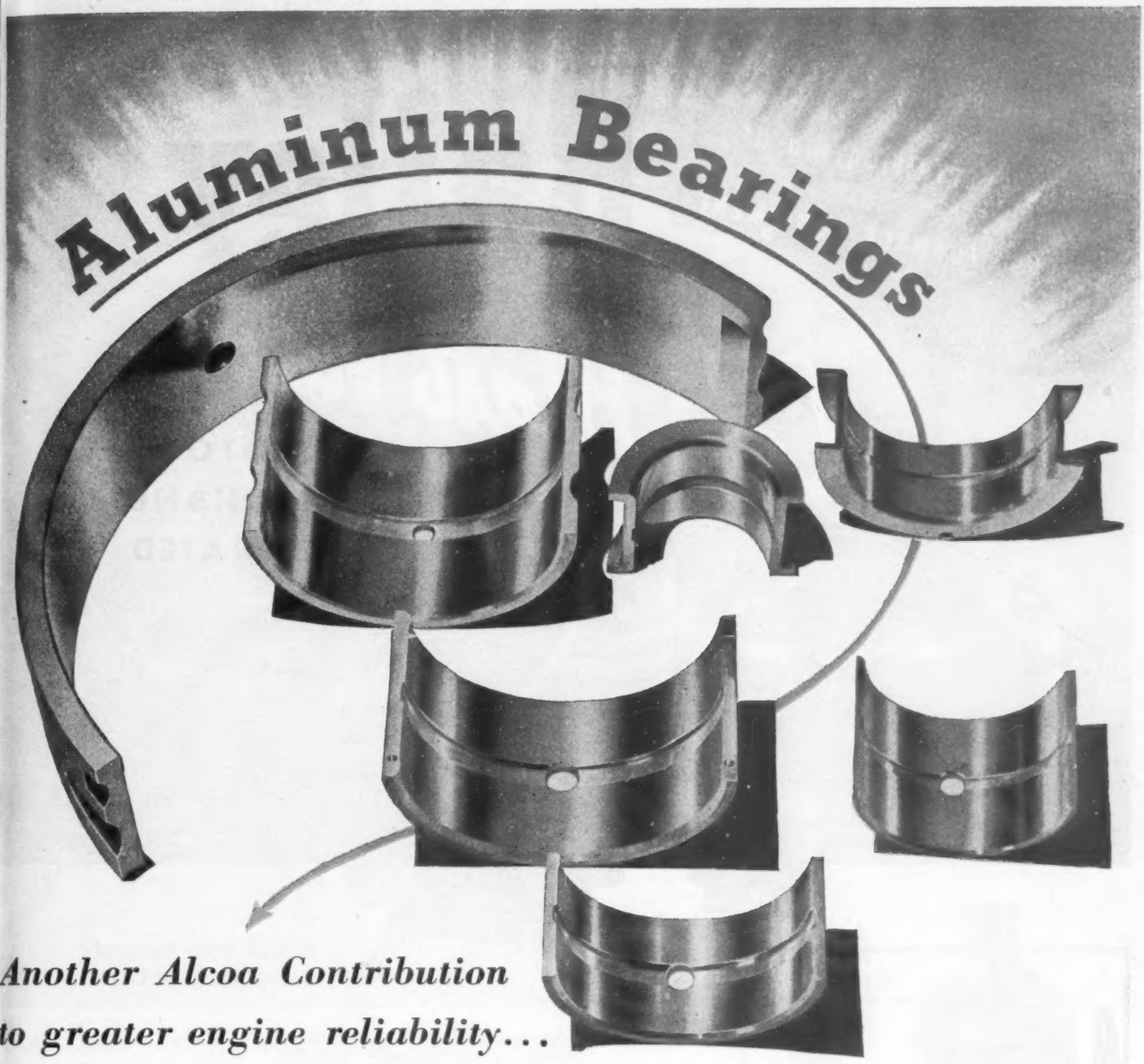
The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia 42, Penna. Offices: Philadelphia, New York, Washington, Boston, Chicago, St. Louis, Cleveland, San Francisco, Houston, Pittsburgh.



BALDWIN

HYDRAULIC PRESSES

Aluminum Bearings



Another Alcoa Contribution to greater engine reliability...

You can safely operate Alcoa Aluminum bearings at higher loads. This is a proved fact—proved repeatedly under scientific control on the test floor and under the varied circumstances of severe routine service.

These bearings are bearing metal clear through. Alcoa bearing alloys offer excellent bearing characteristics. Their high heat conductivity lowers surface temperatures.

Don't be surprised when an engine builder gives you this evidence of a big step forward—"We're using Alcoa Aluminum bearings for better performance and greater reliability." A number of manufacturers have standardized on them for their heavy-duty work. ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh 19, Pa.

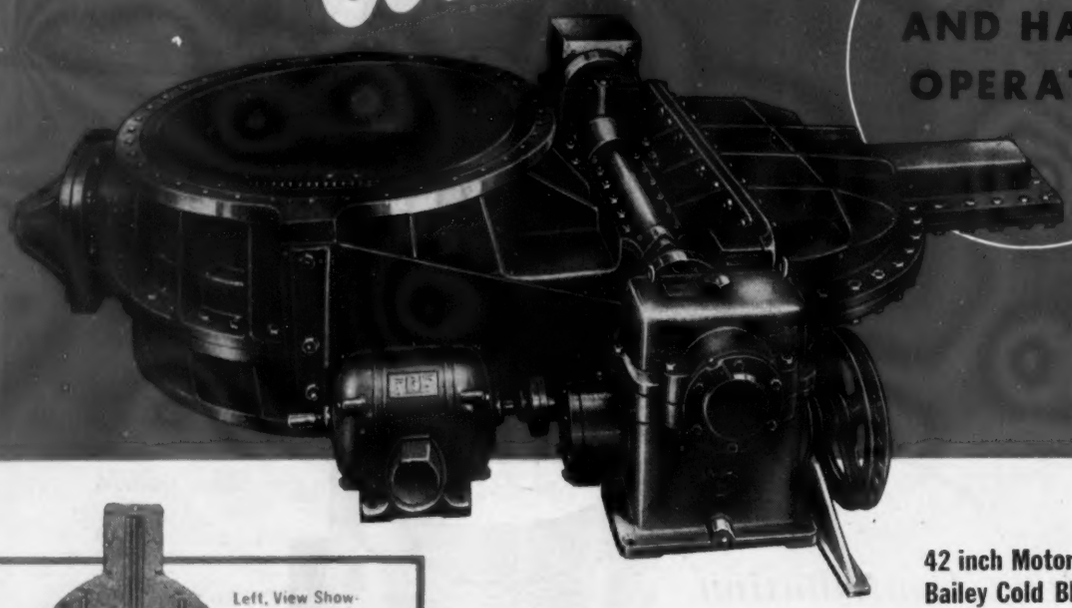
ALCOA FIRST IN **ALUMINUM**

ANOTHER BAILEY STEP IN
THE ELECTRIFICATION OF
BLAST FURNACE EQUIPMENT

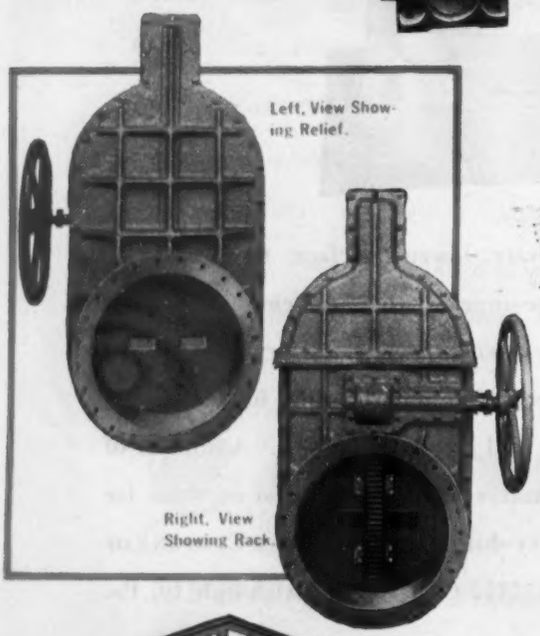
Bailey

Cold Blast Valves

MOTOR AND HAND OPERATED



42 inch Motor Operated Bailey Cold Blast Valve.



Left, View Showing Relief.

Right, View Showing Rack.

HAND OPERATED VALVE

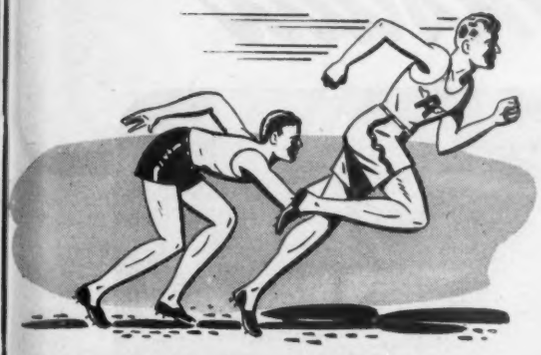
These Bailey Valves are successfully used on cold blast main entering Hot Blast Stoves. Body Castings are made of either iron or steel.

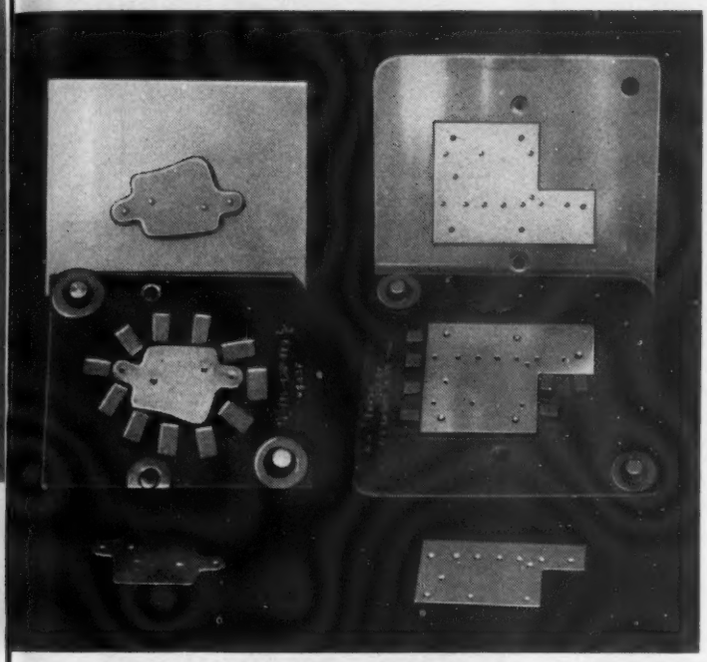
Motor-Operated Valves built in same sizes.

WMBCo

WILLIAM M. BAILEY COMPANY *Engineers* PITTSBURGH, PENNSYLVANIA

YOU GET OFF TO A *Head Start* WITH ALGOMA TEMPLATE DIES!

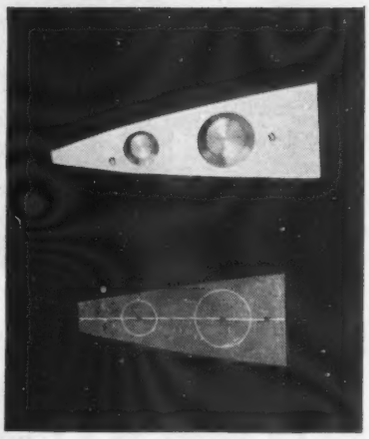




Almost ready while you wait . . . Algoma's dies, sawed from special alloy steel, sheered and filed to size, hardened and welded to inexpensive backplates . . . and there you are, dies in ¼ the time at ⅓ the cost . . . you're in production . . . "superfast." Pierce punches are individually replaceable, are of hardened and drawn tool steel and pressed into the blank die for piercing the holes in the part, adding life to Algoma dies. No matter what your problem, talk it over with us. We're sure there's an Algoma die to do your job.

ALGOMA HYDRO-FORM BLOCKS FOR FAST DELIVERY

Hydro-Form Blocks are made from hot rolled boiler plate, machined and polished to prevent scratching of parts. Mounted in the press with rubber blocks they are furnished complete with pilot pins for location of parts. They are made to your specifications.



GET QUICK ACTION . . .
TELL US THREE THINGS . . .

The metal, the gauge, the size of the run. Send a template of the part. That's all . . . you'll get a figure fast. An opportunity to prove our assertions about Algoma Template Dies is all we ask.

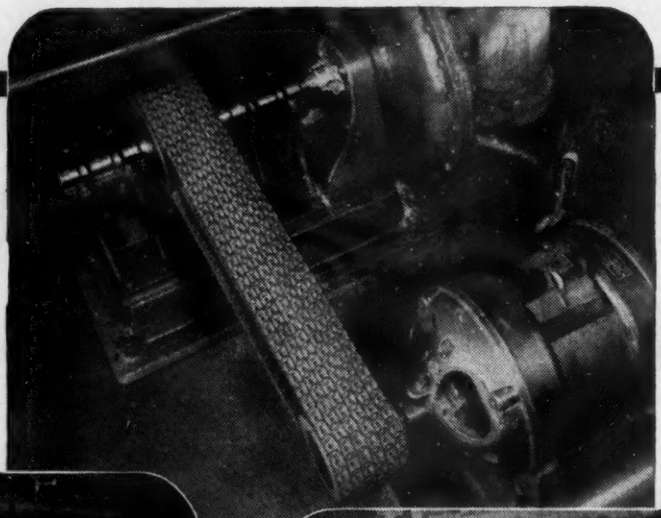
FOR A HEAD START, BE WISE
SPECIFY ALGOMA TEMPLATE DIES

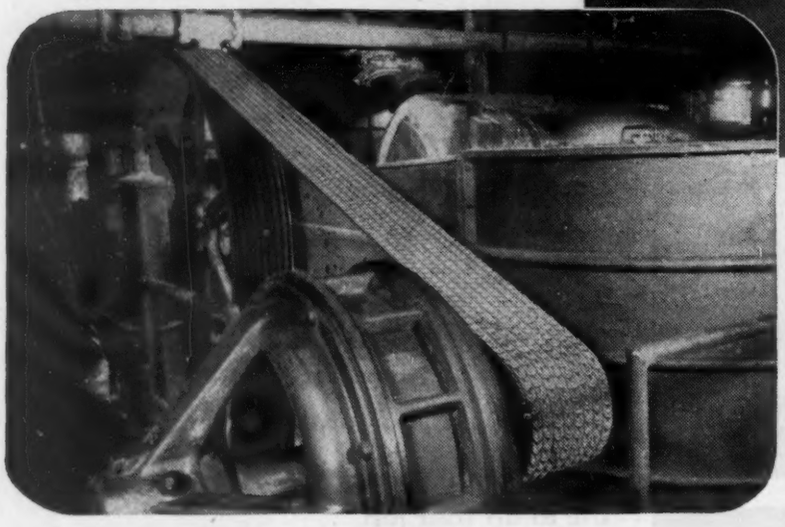
Algoma · PRODUCTS ·

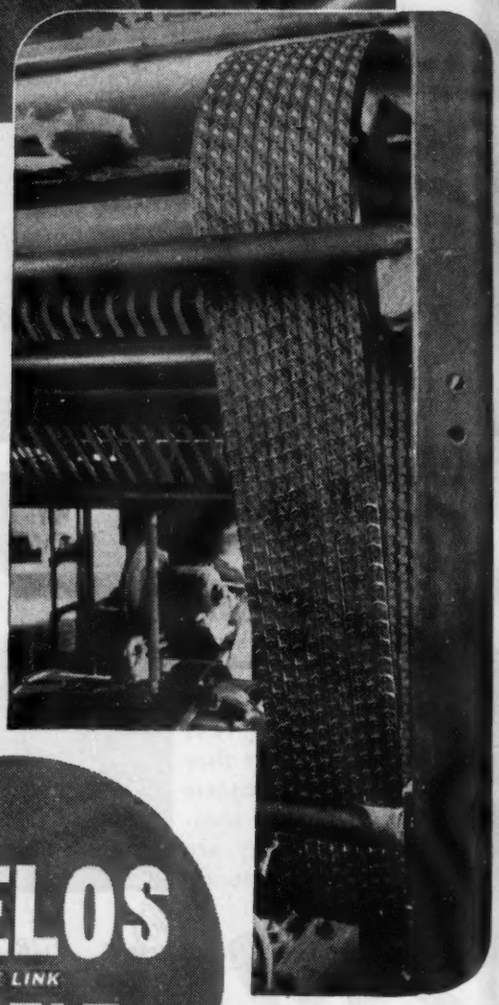
3080 EAST OUTER DRIVE • DETROIT 12, MICHIGAN

"Easier to Install"

. . . SAYS PLANT ENGINEER ABOUT VEELOS







ON drive after drive in a big Eastern manufacturing plant . . . over a wide range of equipment . . . under a variety of service conditions . . . you'll find the belt used is Veelos. And Veelos, the adjustable, link V-belt, drives all of this equipment with maximum efficiency.

When asked *"Why Veelos?"*, the plant engineer replied, *"It's easier to install."* He was talking straight to the point! Easier installation is one of the big advantages provided by Veelos link construction. Among the others are:

1. Adjustability to End Slippage: Veelos link construction provides quick, easy tension adjustment to end slippage.

2. Controlled Tension Protects Bearings and Belts: Control of tension on each individual strand permits uniform, controlled tension in the entire drive. This protects bearings as well as belts.

Learn How Link Construction Ups Production

Write today for free 8-page illustrated manual giving Veelos applications, construction detail, installation directions and engineering data.

MANHEIM MANUFACTURING & BELTING CO.
MANHEIM, PENNSYLVANIA

VEELOS
THE LINK
V-BELT
Adjustable to any Length
Adaptable to any Drive

Where
HEAT and CORROSION
must be resisted —
Choose —
Superior
STAINLESS
STRIP
STEEL
The ravages of high temperature and corrosion are barred from your products when you build with stainless steel—and when you specify Superior Stainless STRIP Steel, every production advantage is realized. The exact required physical characteristics and dimensions for your needs join with any desired coil lengths to simplify your fabrication problems. Let us detail the Superior reasons!
Superior Steel
CORPORATION
CARNEGIE · PENNSYLVANIA

"Saw the heavens filled with commerce"

The world has grown up, aerodynamically, over night. Tomorrow's airliners and cargo ships—overseas leviathans and family flyabouts are here. Hovering helicopters and jet propelled planes are out of their swaddling clothes and on the production line. America is ready to take to the air.

Because war can't wait—airplanes have made technological advancement that would have meant years—perhaps decades of development under peacetime progress. In the matter of aircraft engines alone, not only has horsepower been tremendously increased, but entirely new principles in propulsion have been developed.

Today Foote Bros. "A-Q" (aircraft quality) gears are serving in the engines that power fighters, bombers and transports. Producers of the revolutionary helicopter and jet propulsion engines also rely on "A-Q" gears to help solve difficult problems in power transmission.

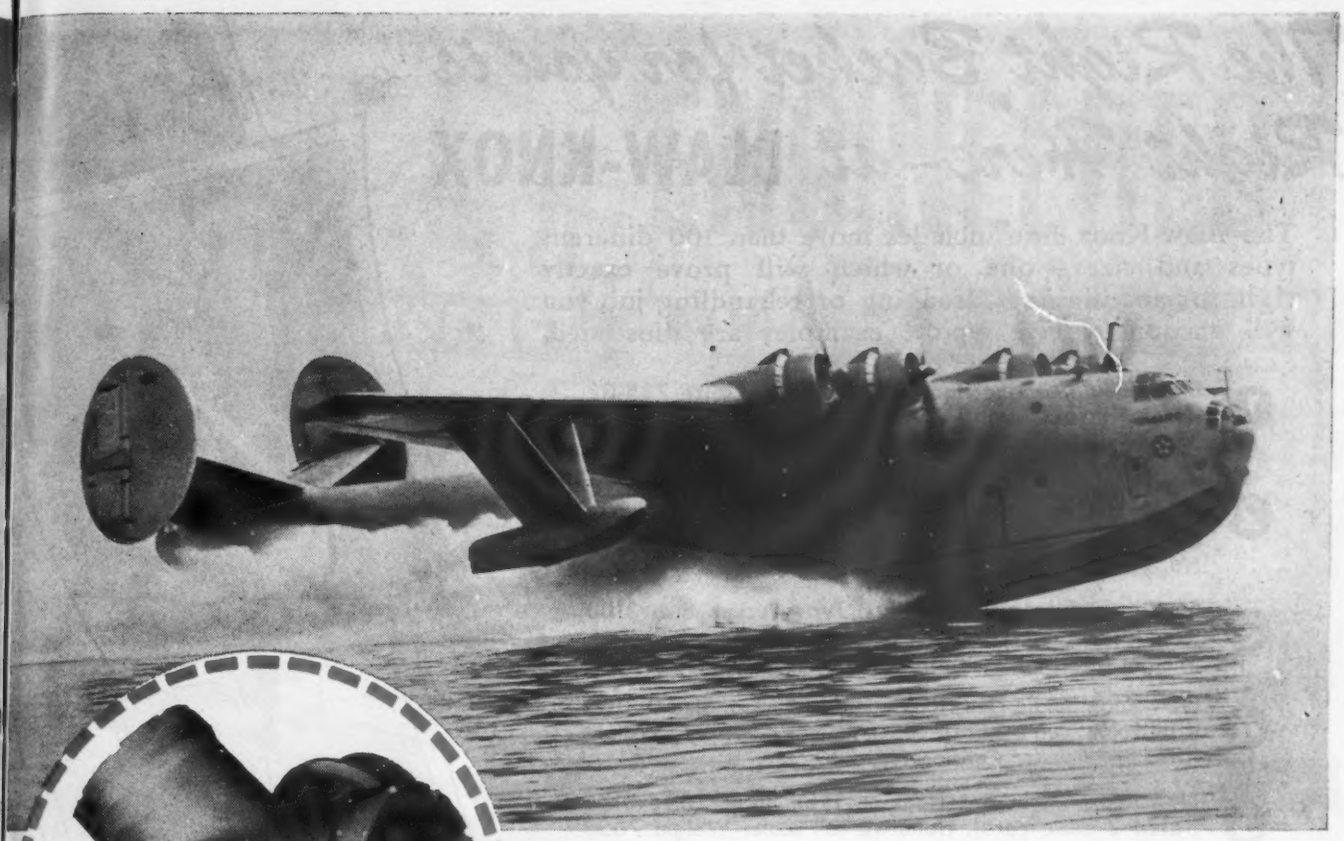
These gears represent a new advance in design and production methods. They assure greater mechanical efficiency, lighter weight, quieter operation, greater compactness. Applied to the machinery and equipment you are manufacturing or planning to manufacture, they will assure many competitive advantages—help you solve many engineering problems. Foote Bros. engineers will be glad to consult with you on the application of these new developments in power transmission to your product.

FOOTE BROS. GEAR AND MACHINE CORPORATION, Dept. X, 5225 S. Western Blvd., Chicago 9, Ill.

A copy of this informative product engineering manual on "A-Q" gears will be sent to you on request. Write for copy.

FOOTE BROS.

Better Power Transmission Through Better Gears



Where one pound of steel holds *7,500 times its weight*

● That may seem fantastic—but it's true. The strain imposed upon the hub of a 16½-foot, 3-blade propeller by centrifugal pull is 582,000 pounds. The hub weighs 77.6 pounds. Thus each pound of steel in it must hold 7,500 pounds of pull.

That's one reason for using Republic Electric Furnace Steel for hubs as well as for hollow propeller blades. But there's another very important reason.

Many costly man- and machine-hours are consumed by the 37 operations required to machine a 381-pound forging down to the hub shown above. Suppose a small imperfection in the steel should cause rejection at final inspection. All that time and costly work would be wasted—and many dollars lost.

Republic Electric Furnace Steels are the best insurance you can buy against such losses. These outstanding steels are as CLEAN and SOUND as steel can be made.

They are consistently UNIFORM—in physical, chemical, hardenability and performance values — because they are "targeted" to hit product and processing specifications on the nose repeatedly. This can be achieved only in electric furnace melting.

If you employ mass production methods of manufacture, Republic Electric Furnace Steels can help you obtain maximum results—because of their homogeneity and their freedom from practice-upsetting variables.

And, too, these fine steels may be just what you will need to increase the salability of your products. Right NOW is the time to find out. And Republic — world leader in electric furnace steels — is ready to work with you.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC
—Leader in the Production of
ELECTRIC FURNACE STEELS
"QUALITY" steels . . . alloy . . . stainless

The Right Bucket for you is Right Here—at BLAW-KNOX

The Blaw-Knox line includes more than 100 different types and sizes—one of which will prove exactly right for any digging, dredging or rehandling job you will encounter. Five typical examples are illustrated.

1. Blaw-Knox Two Line Hook-on Type Bucket. Size 735-02 (rated 3 cubic yard). Open Hearth service. Weight 20,350 lbs. ***Ask for Catalog No. 2002.***
2. Blaw-Knox Single Line Hook-on Type Bucket. Size 3201 (rated 2 cubic yard). Loading Open Hearth limestone into charging boxes. Weight 18,600 lbs. ***Ask for Catalog No. 2002.***
3. Blaw-Knox Single Line Hook-on Type Bucket. Size 3100 (rated 1¼ cubic yard). Blast furnace cast house service. Weight 4800 lbs. ***Ask for Catalog No. 2002.***
4. Blaw-Knox Single Line Hook-on Type Bucket. Size 0-3100 (rated 1¼ cubic yard). Steel Foundry Service. Weight 4100 lbs. ***Ask for Catalog No. 2002.***
5. Blaw-Knox Single Line Hook-on Type Bucket. Size 3175 (rated 2 cubic yard). Handling roll scale. Weight 7650 lbs. ***Ask for Catalog No. 2002.***

Other Blaw-Knox Catalogs describe and illustrate complete steel plant bucket applications.

BLAW-KNOX DIVISION
of Blaw-Knox Company
2002 Farmers Bank Building, Pittsburgh, Pa.
NEW YORK CHICAGO PHILADELPHIA BIRMINGHAM WASHINGTON
Representatives in Principal Cities

BLAW-KNOX
CLAMSHELL
BUCKETS

ENGINEERED

FOR PRODUCT AND MACHINE DESIGN

One of the most vital spots in production machinery and in many other engineered products is the feed line system . . . the hose or tubing which carries coolants, hot water, steam, compressed air, solvents, gases, chips, dust, etc. This is especially true when such feed or exhaust lines connect moving parts . . . where both enduring strength and extreme flexibility are equally necessary.

The solution of the problem definitely calls for Metal . . . AMERICAN Flexible Metal Hose and Tubing which combines the strength of metal with the flexibility of rubber for long life under even the most exacting conditions.

While American's engineers have designed thousands of special assemblies of tubing and couplings for specific duties, there are among them an infinite number of combinations which will solve almost any conceivable requirement for flexible connectors. When you consider that the cost of *one* "down-time" of a production machine, due to piping failure, will pay for the *best* Flexible Metal Tubing feed line system . . . it's time to specify "AMERICAN."

ASSEMBLIES

We show here a few special and standard assemblies of both American "Seamless" and strip wound tubing, together with the required couplings. Standard types are "Steamtite Connectors," used as steam lines on laundry presses; "Vibration Eliminators" for insertion in rigid pipe lines; and "Bracket-ubes," permanent steam connections on molding presses. Special assemblies cover so many applications that we can only say . . send us your blueprints for specific recommendations . . . our Engineering Department is at your service.

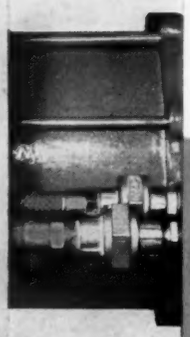
ANACONDA
from mine to consumer

American Metal Hose

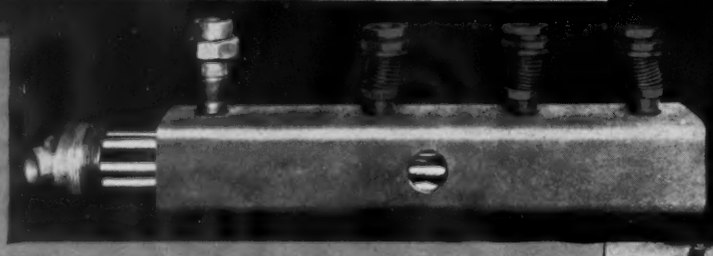
AMERICAN METAL HOSE BRANCH of THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Conn. Subsidiary of Anaconda Copper Mining Company

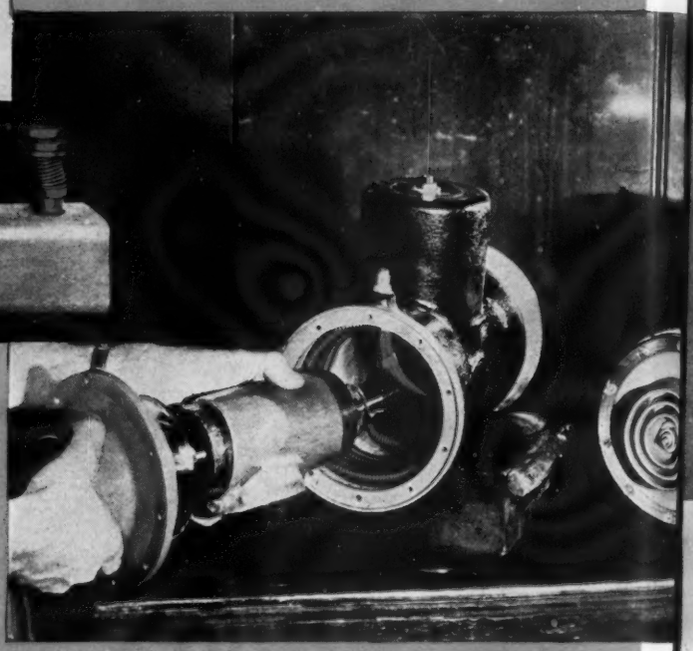
In Canada: Anaconda American Brass Ltd., New Toronto, Ont.



Left: High pressure air lines had to be fitted into a cramped space but the designer of this tube beader found the answer in American Seamless. Photo courtesy: Vaill Engineering Co.



These short flexible assemblies proved to be the solution in connecting this "Header-Heater" to sectional boilers. Flexibility Compensates for differences between Tappings. Photo courtesy: Burnham Boiler Corp.



American Seamless bends to small diameters and easily fits the "profile" of this x-ray tube while conveying water to cool the tube. Photo courtesy: Machlett Laboratories.

DESIGNED RIGHT FROM THE START

From the standpoint of feed lines, many of the country's leading machine and product designers are making sure of smooth functioning by getting American Flexible Metal Hose and Tubing on the drawing boards . . . "Right" . . . from the start.

American Flexible Metal Tubing contributes to operating efficiency in many ways. It has strength beyond other materials . . . flexibility that makes it last even after millions of constant flexings; it will absorb machine vibration; it is easily installed; it can be made of alloys that resist corrosion, abrasion, gases, extremes of temperature . . . it easily handles oil, steam and many chemicals; some types can be bent to any desired position and will "stay put."

American Flexible Metal Hose assemblies are frequently used to connect and compensate for misaligned tappings . . . some are used as protective sheathing for delicate wiring or capillary tubing in recording instruments, X-ray machines, electrical appliances, etc. We will gladly send you bulletins and technical literature covering our products . . . or submit your specific problem to our Engineering Department for recommendations.

The "Life Lines" of your product or machine should be American. Get them "Right" . . . from the start. 45256

AMERICAN METAL HOSE BRANCH OF THE AMERICAN BRASS CO.

General Offices: Waterbury 88, Conn. • • Subsidiary of Anaconda Copper Mining Company

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AUSTENITIC stainless steel exposed in fabrication or service to temperatures between 900° and 1500° F. must be stabilized to prevent intergranular corrosion embrittlement.

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For heat resistance, for tube piercing and for formability titanium stainless steel is the choice of experience.

If you are using stainless steel at high temperatures one of our technical staff will be glad to explain the advantages of titanium to you.

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PRODUCTS
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from the CARDOX case record . . .

Out of actual on-the-job fire experience comes evidence of the ability of Cardox Fire Extinguishing Systems to stop even *big* fires *fast*. File No. S-63, taken from an investigator's report on Cardox extinguishment of a tough transformer fire is a typical example:

"The fire occurred in the outdoor transformer area. It was caused by a short in the 2500-volt bus section and quickly ignited a protective screen above the busses. This protective screen consisted of burlap, rubber sheeting and plywood.

"The Cardox System was actuated automatically and worked perfectly . . . in less than a quarter of a minute (after mass discharge of Cardox CO_2 began) the fire was extinguished. No serious damage was done and operations were resumed after a very small delay. The swift and efficient operation of the Cardox System prevented at least $150,000 damage."

The danger spots in your plant may not be similar to the one described in FILE S-63. But, if for example they involve flammable liquids or electrical equipment of any kind, Cardox offers maximum protection with fast-acting, non-contaminating carbon dioxide . . . in *pounds* for small fires . . . and *tons* for large ones!

For all Cardox Systems have one outstanding characteristic which greatly increases the scope of usefulness and performance value of carbon dioxide in protecting *large* and *small* hazards!

This characteristic is the distinctive Cardox method of control and engineered application of liquid carbon dioxide, stored at 0° F. and 300 p.s.i. in a single storage unit containing from ¼ to 125 tons of fire-destroying Cardox CO_2 . . . enough to handle large fires in single or multiple hazards and leave an ample reserve for new emergencies!

If you have fire problems that are hard to handle, low pressure carbon dioxide can frequently provide the effective answer. A study of your specific fire hazards by Cardox Research Division and Engineering Staff puts you under no obligation. Write for Bulletin 865.

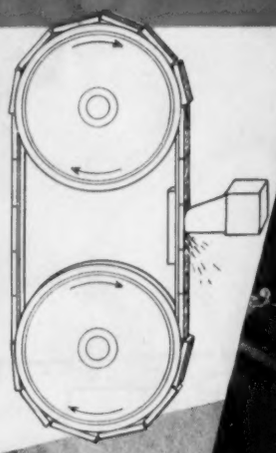
CARDOX CORPORATION
BELL BUILDING • CHICAGO 1, ILLINOIS
District Offices in
New York, Washington, Detroit, Cleveland, Atlanta, Pittsburgh, San Francisco, Los Angeles, Seattle

Cardox CO_2 is supplied instantly in pounds or tons from a single Storage Unit containing 500 pounds to 125 tons at controlled low temperature of 0°F. and 300 p.s.i.

CARDOX
CO_2 FIRE EXTINGUISHING SYSTEMS

2 WAYS TO REMOVE FLASH

Both DoALL



You can do it on the DoALL Contour Machine or on a DoALL Band Filer. Both accommodate the ⅜" File Band which finished these metal statuettes at the rate of one per minute.

The DoALL method is a smooth, continuous, one-way operation with no loss of time, motion or energy. Today's fastest way to finish parts or products made from metals, alloys, plymetals. And, it's 4 times faster than jig filing, 9 times faster than hand filing.

Contour Machine — Thousands are in use today shaping parts used in important war equipment. Although used primarily for internal and external sawing, file bands are included as standard equipment with each DoALL Contour Machine.

Band Filer — For continuous filing here's the best solution — a variable speed precision machine that accommodates work up to 6" thick. The 18" square work table tilts for angle filing. Occupies only 27" x 34" floor space.

Send for your copy of circular **BAND FILING TO PRECISION TOLERANCES**

Contour Sawing

Band Filer

Super Surface Grinders

Grinding Wheels

Colloidal Cutting Oils and Soluble Oils

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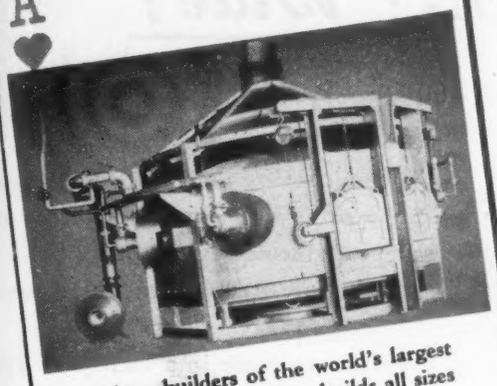
ANY RADICAL HEATING PROBLEMS UP YOUR SLEEVE?

LET SALEM APPLY *Engineered Heat*



Salem, builders of the world's largest rotary forging furnace, builds all sizes of rotary furnaces.

In considering ways to meet the low cost, high quality market ahead, you probably have mustered a few heating problems on which you would like to have experienced assistance.

Salem, for many years, has specialized in developing conventional and unconventional heating equipment.

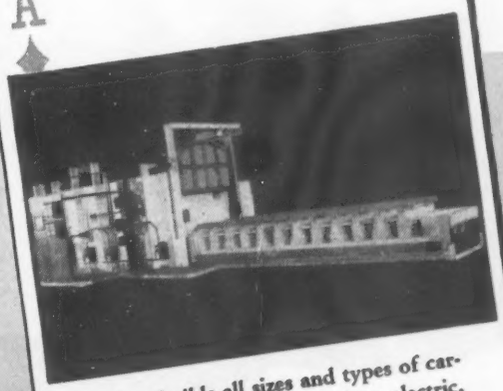
When people say—"no, it can't be done"—that's when we like to get busy. Here are a few of the unusual Salem developments: Reciprocating Bar Pusher, Rol-O-Veyor, Witter Mill, Circular Soaking Pit and many "hush-hush" items for war production.

Conventional or unconventional, we combine economics with engineering—a service we call Engineered Heat. So if you have any heating problems, put Salem to work for you. All correspondence held in strictest confidence, of course.

Salem builds all sizes and types of heat treating furnaces and circular soaking pits

SEND YOUR INQUIRY TO SALEM

Continuous pusher type heat treating furnace with a double chamber.



Salem builds all sizes and types of car-type furnaces for gas, oil or electric, direct or recirculating.

SALEM **SALEM** OHIO

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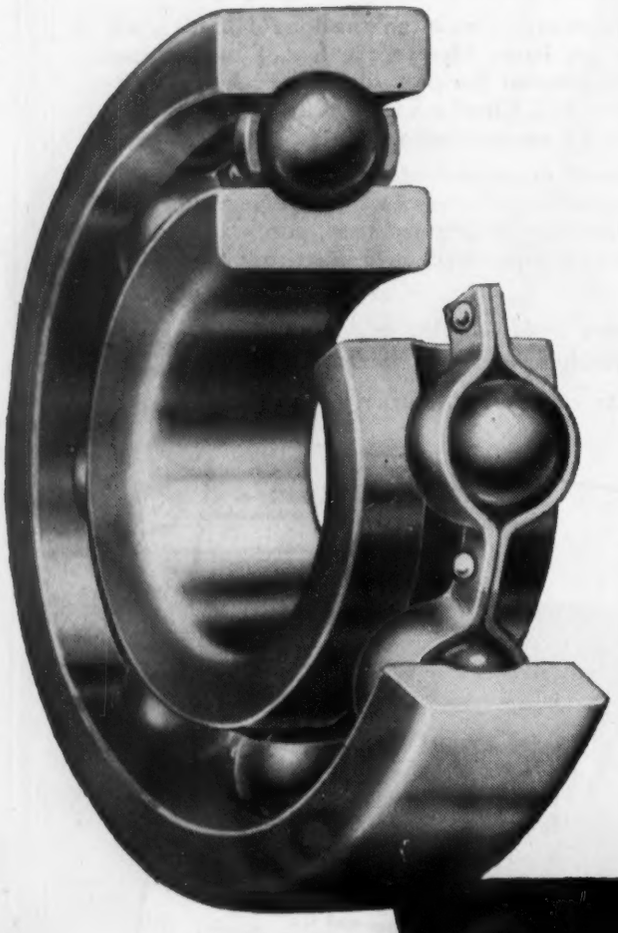
BEARING? *BCA Radial*

CONSTRUCTION? *Sturdy!*

APPLICATION? *Wide!*



SOUND design engineering calls for *careful* consideration of bearings *before* final blueprints are drawn. Where a dependable and sturdy radial bearing is required, the BCA single row Conrad (illustrated) will repay careful study.

BCA radial bearings are made in a variety of types for a wide range of applications—both in new equipment and as replacements. These bearings include single row Conrad; single row Conrad with metal shield; single row Conrad with felt shield; single row Conrad with snap ring groove and single and double row maximum types. Careful engineering and sound construction fit each bearing to the condition of load and shock for which it is designed.

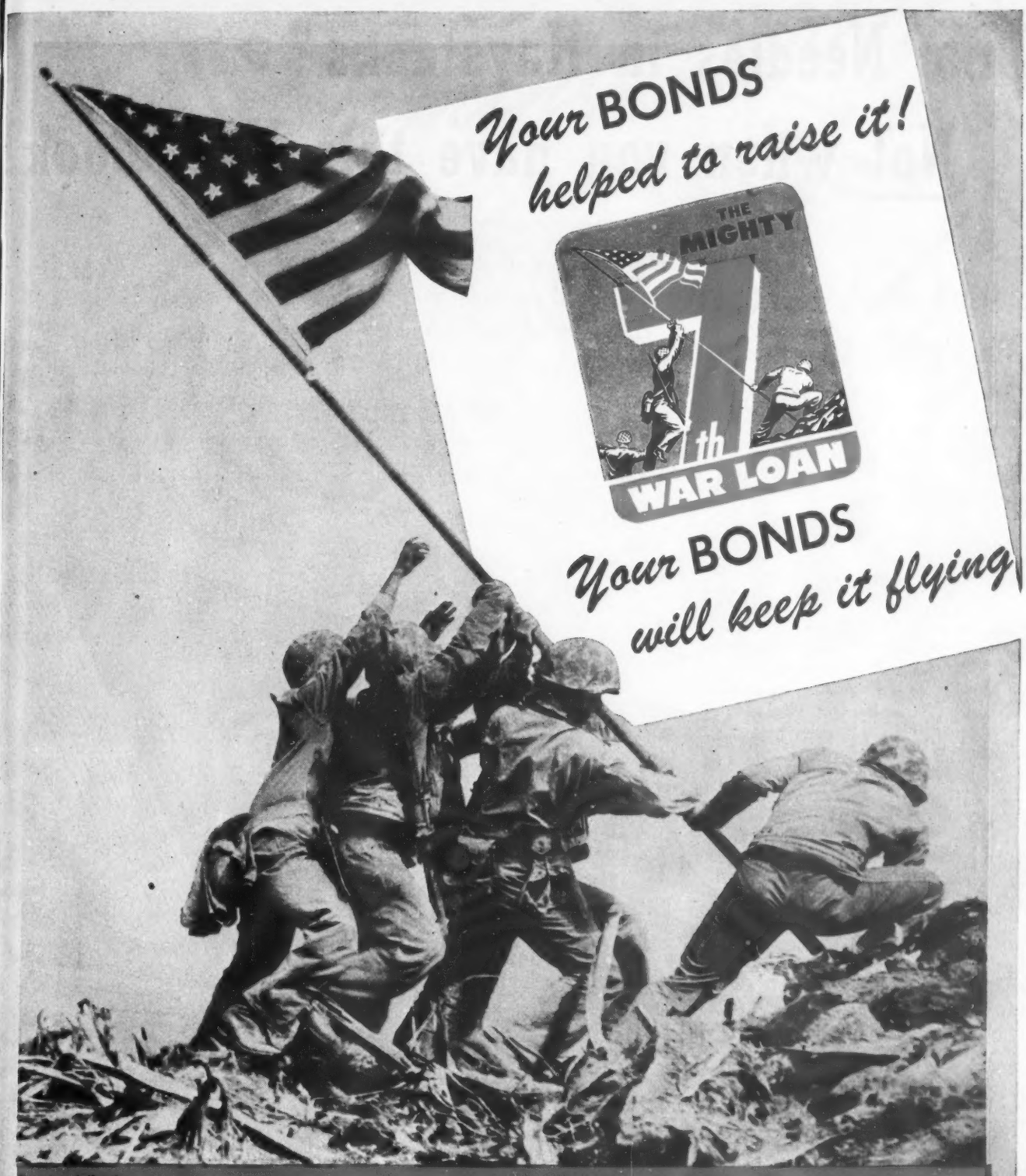
Where your design or replacement requirements . . . present or future . . . indicate radial, angular contact or thrust ball bearings, consult a BCA engineer. He's ready to give you up-to-the-minute data about each type.

BEARINGS COMPANY OF AMERICA • LANCASTER, PA.

BCA

RADIAL • ANGULAR CONTACT • THRUST

BALL BEARINGS



We are with you 100% in raising the ★ ★

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Taming 8800 Horses OVER TOKYO

Wright Cyclone Engines ...rings of Pittsburgh Steel

Upon the *complete integrity* of the two bearing shells, in each of its four 2200 H.P. Wright Cyclone Engines, depends the success of every B-29's mission over Tokyo! This *tremendous responsibility* has been safely entrusted to bearings fabricated from Pittsburgh Seamless Steel Tubing.

The mighty, surging strength of 2200 "horses" is transmitted as dynamic power through these main bearings of tubular steel. Sustaining a take-off load of 4000 pounds per square inch, or a diving load that may reach as much as 7200 p.s.i., the flawless character of the steel required is obvious. *Pittsburgh Seamless,* for bearing back purposes, combines the requisite strength with the extraordinary cleanness necessary for the successful application of the mirror-smooth silver plating of bearing surfaces.

Over Tokyo, or in the less spectacular but equally exacting applications of industry, the *quality* of *Pittsburgh Seamless* can be counted on to do the job.

PITTSBURGH STEEL COMPANY
1653 Grant Building · Pittsburgh, Pa.

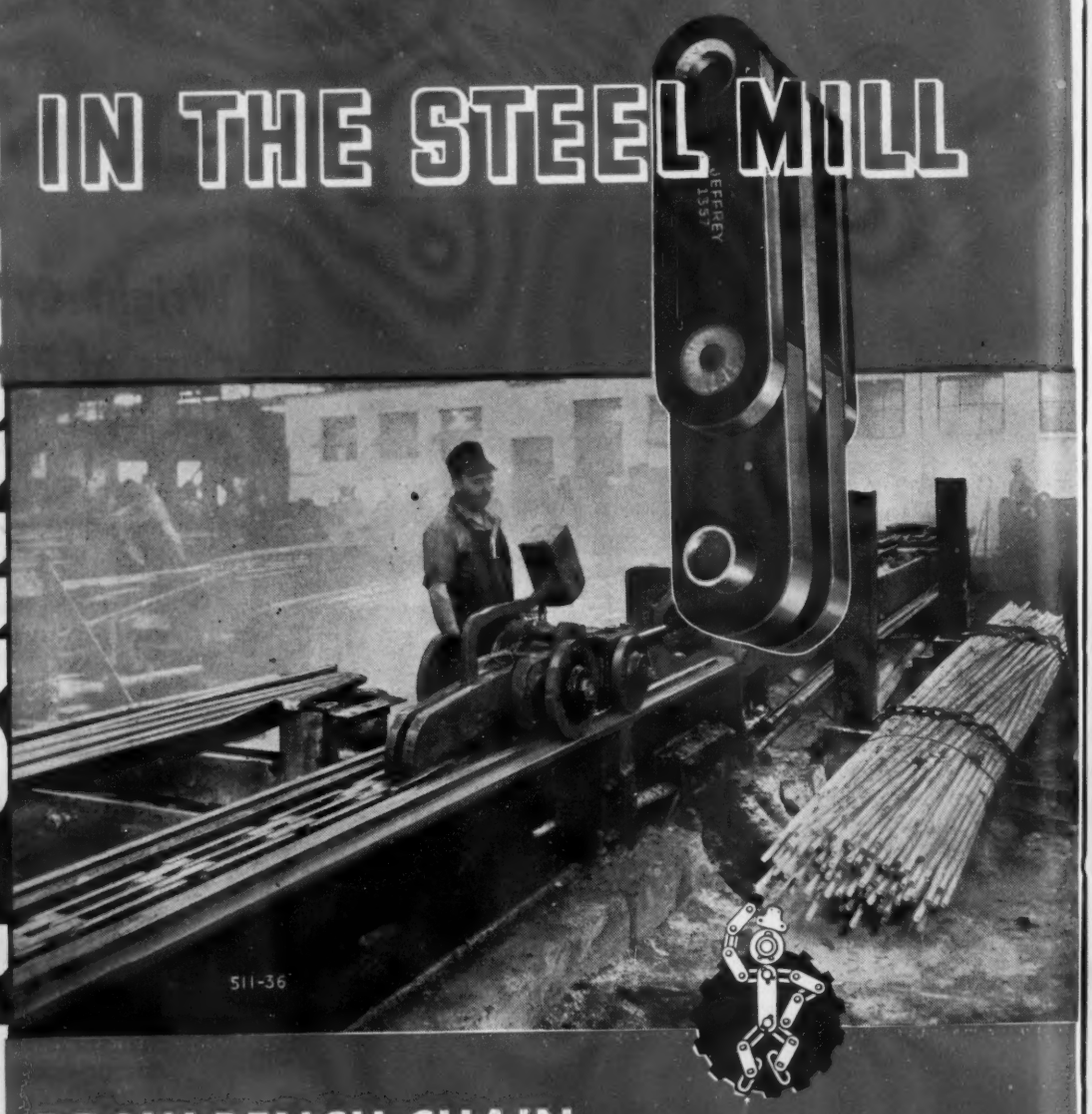
A typical main bearing, removed from its master rod, is shown at left. The entire horse power load from 2 sets of 9 radial cylinders is sustained by two such bearings.

PITTSBURGH SEAMLESS STEEL TUBING
CARBON, ALLOY, STAINLESS STEEL

...LY THE BEST IN STEEL IS GOOD ENOUGH TO FLY

The heart of the Boeing B-29 Super-Fortress is its four 2200 H.P. Wright Cyclone 18 Engines, one of which is illustrated at right. Another famous Wright Engine, The Cyclone 9, uses a Pittsburgh steel bearing in its single radial design.

JEFFREY CHAINS IN THE STEEL MILL



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A TUG-OF-WAR IN STEEL! . . . . . .

You see it going on hourly and yearly on the draw bench, this battle between chain and bars . . . with chain *invariably* the victor when it is Jeffrey-made.

This superiority in the tug against tough cold steel reflects the stamina imparted by thorough methods, the care and scientific heat treatment employed in building Jeffrey chains for draw bench and other steel mill service.

Many new precision machine tools have been added to our chain plant. Our heat treating department has been re-equipped with the finest control instruments. All this has been done to assure you of improved results in life and service from Jeffrey chains. It is, too, a continuance of a 60-year tradition of conscientious manufacture.

You will like the champion quality of Jeffrey chains.

Also chains for Sheet Piling . . Hot Slab Transfer . . Crop Conveying . . Feeder and Catcher Tables . . Pack and Pair Furnaces . . Normalizing Furnaces

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PROTECTING office machine parts since the typewriter was born . . .

New problems of protecting the life and appearance of internal and visible parts arise almost constantly in the progressive office machine field. Yet, as the tempo of business has quickened, the industry has met the challenge with products ever faster and more efficient, and with increasing eye-appeal.

Hanson-Van Winkle-Munning has been helping the industry's leaders solve close specification plating problems since the first typewriter appeared.

H-VW-M plating equipment experience, for *all* industries, has been accumulating since the development of electroplating on a commercial scale. We are ready today to work with you in the layout and engineering of new metal plating and finishing departments, and to offer technical counsel on improved operation of existing plants.

H-VW-M bulletins and technical papers are authoritative references on much of what we've learned in our century and a quarter of service in plating and finishing. Those which bear on your own plating problems are yours on request.

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QUALITY AT THE RIGHT PRICE is your key to profits in tomorrow's competitive markets. And Roebling Strip Steel (up to 10" wide) can help you save *dollars*, man hours and metal with smoother, steadier operation in punching, forming and drawing on an infinite variety of parts and shapes. Rigidly adhering to specifications of temper, finish, steel analysis, tolerance, Roebling Strip Steel will give you *higher quality* and increased production.

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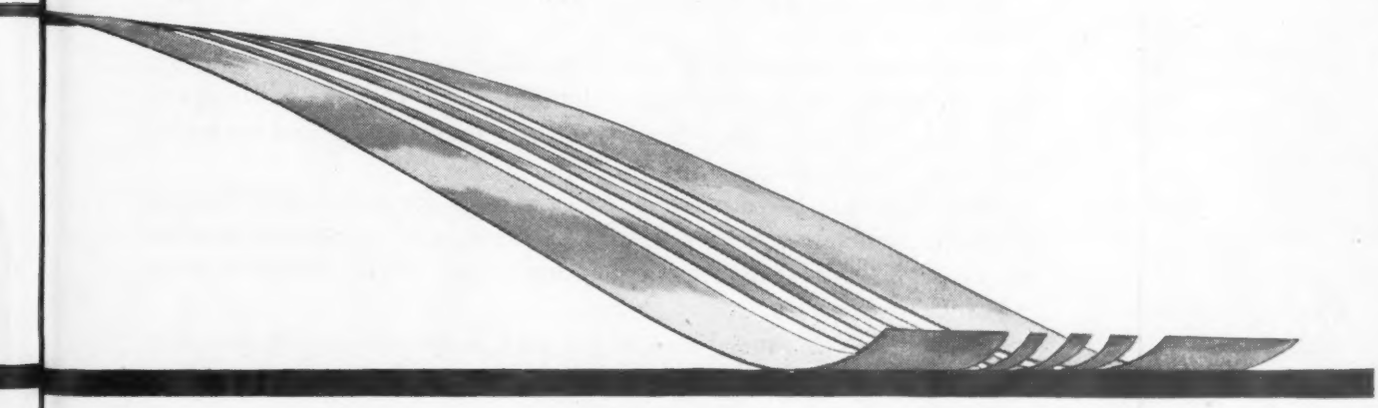

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RIGIDITY plus FATIGUE RESISTANCE plus STRENGTH

• This is the side frame of a modern freight car, a one-piece steel casting.

Side frames used to be made by assembling many parts—a costly process.

Now these one-piece castings provide the strength, rigidity, and resistance to metal fatigue demanded by today's high-speed railroad operation. They hold their alignment and stand up under repeated shock, impact and multiple stresses.

The railroads have proved steel castings for you—side frames, couplers, bolsters, center fillers, strikers, and countless smaller parts—each meeting its own conditions with prescribed-in-advance properties.

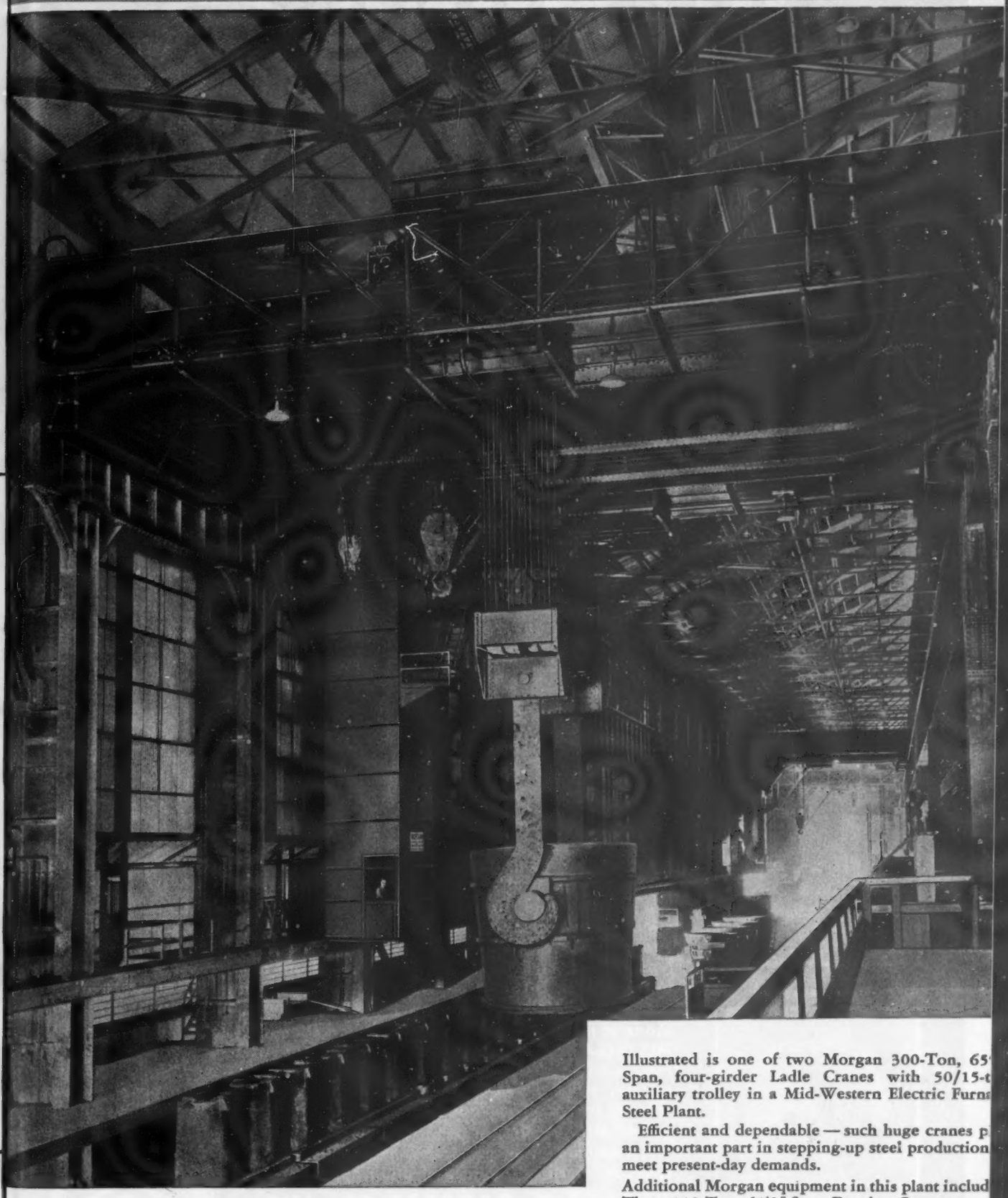
With steel castings, you can get any shape you want, and any combination of steel properties you want—the modern way to turn out a better finished product.

Let your steel foundryman advise with you. Or write for information to Steel Founders' Society, 920 Midland Building, Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

BUILT BY MORGAN *Engineering*



MORGAN 300-TON, 65′0″ SPAN POURING CRANE

Illustrated is one of two Morgan 300-Ton, 65′ Span, four-girder Ladle Cranes with 50/15-t auxiliary trolley in a Mid-Western Electric Furna Steel Plant.

Efficient and dependable — such huge cranes p an important part in stepping-up steel production meet present-day demands.

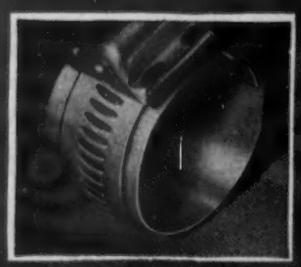
Additional Morgan equipment in this plant includ Three 150-Ton, 65′0″ Span Pouring Cranes. Two 150-Ton, 80′3″ Span Hot Metal Charging Cran Two 200-Ton, 63′0″ Span Universal Type Ing Strippers.

THE MORGAN ENGINEERING CO.

ALLIANCE, OHIO. 1420 Oliver Building, Pittsburgh

DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOM MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVEL CRANES • CHARGING MACHINES • INGOT STRIPPING MACHI SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LA CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRE SPECIAL MACHINERY FOR STEEL MILLS

DIAMOND G MULTI-CLAMP



Individually designed for Special Applications

Single size, smooth non-serrated contact

Double Safety Feature—mechanically held and welded

Easy to Install—no disassembling

The Clamp of a thousand uses...

Here's a new clamp that meets the needs of many industries . . . a clamp that solves scores of problems quickly and economically!

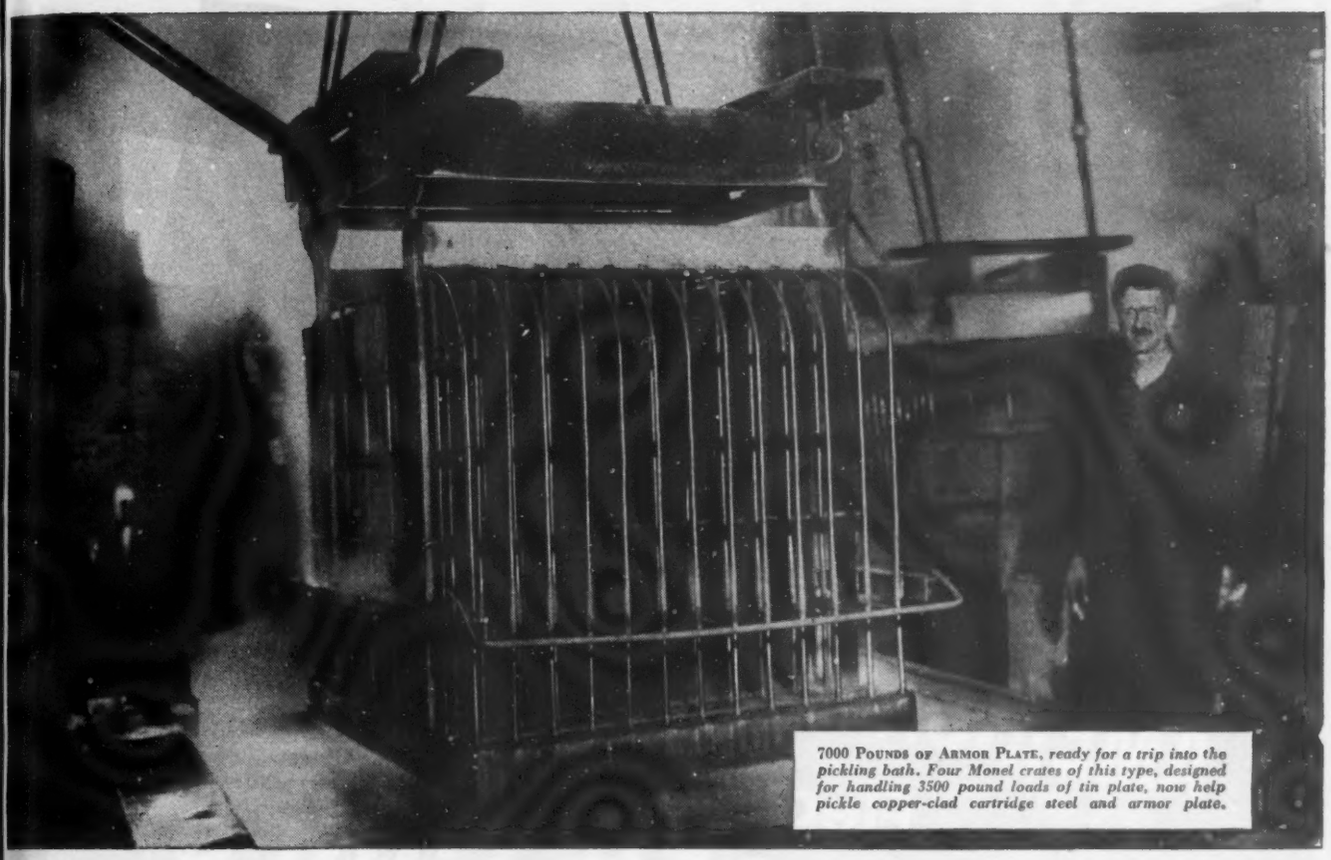
The new Diamond G MULTI-CLAMP instantly FITS and HOLDS rubber hosing, metal pipe, tubing, cables and other equipment in a vise-like grip. No wrench, no screw-driver, no disassembling necessary. The patented worm-type self-locking screw assures uniform instant adjustment. Each standard MULTI-CLAMP covers a wide range of sizes and adjustments. Continuous "gear-action" solid band prevents leakage or unequal pressure at any point!

Made of fine carbon steel, rust-proof and cadmium plated, the Diamond G MULTI-CLAMP meets Army-Navy specifications AN-FF-C 406a. It can be re-used many times and is practically indestructible. Mechanically held and securely welded . . . a double safety feature! For special purposes, various types of inserts, extra wide bands of metal, plastic or rubber are available.

See the MULTI-CLAMP in action. Sample on request. One test will convince you . . . for automotive, hydraulic, pneumatic, electronic, aviation, electrical or general plant applications.

GEORGE K. GARRETT CO., INC.
1421 CHESTNUT STREET, PHILADELPHIA 2, PA.

DIAMOND G PRODUCTS



7000 POUNDS OF ARMOR PLATE, *ready for a trip into the pickling bath. Four Monel crates of this type, designed for handling 3500 pound loads of tin plate, now help pickle copper-clad cartridge steel and armor plate.*

Steps up payloads to TWICE their pre-war weight

. . . Monel pickling crates, designed by Youngstown Welding & Engineering Co. handle DOUBLE tonnage for war production

Pickling crates that consistently handle double their planned-for payloads are doing a remarkable job, you'll agree.

Service of this kind means the crates were made *right* . . . of the *right* material.

The crates shown here were designed and fabricated of Monel by the Youngstown Welding and Engineering Company. Before the war, they were used for pickling tinplate in loads that averaged 3500 pounds.

When the mill switched over to producing armor plate and copper-clad cartridge steel, the loads were stepped-up to 7000 pounds and more. Despite this heavy added burden, the Youngstown designed Monel crates worked without a hitch. They have helped increase production substantially by their trouble-free service.

In the same mill, six other Monel crates also give evidence of Monel's great length of life under severe pickling conditions. After 13 years of service pickling high-silicon electrical steel sheets, they too are now in steady use, pickling armor and cartridge steel.

The unique combination of properties possessed by Monel makes it ideal for pickling room uses. Tough, strong, highly resistant to corrosion, Monel is excellent for pickling hooks, hangers, yokes and chains, as well as for crates and baskets.

For full information about the use of Monel in pickling please write The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.

NICKEL (INCO) ALLOYS

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • "Z" NICKEL • NICKEL

Sheet...Strip...Rod...Tubing...Wire...Castings...Welding Rods (Gas and Electric)

"TAILORED" TO YOUR NEEDS!

YOU may have design or manufacturing problems for which welded steel tubing is the best answer. Why not call upon our twenty-eight years' experience in this field to help you?

We make electric-resistance welded tubes in outside dimensions up to 5 1/2 inches and with wall thickness up to 5/16-inch. You can forge, upset, swage, expand, form, heat-treat, machine or weld them—*exactly as you need!*

We have the most modern facilities to do all these things in production quantities. Possibly we can save you time, money, and improve the performance of your product.

AMERICAN METAL PRODUCTS COMPANY

5959 Linsdale Avenue, Detroit 4, Michigan

How Gondola Cars are Unloaded at Kaiser Steel Plant--

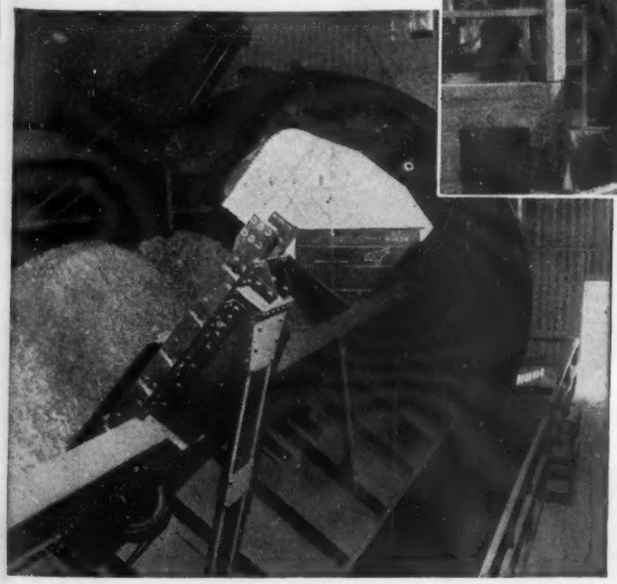
LINK-BELT

Rotary R. R. Car Dumper Can Unload up to 20 Cars per hr.

• This Link-Belt car dumper in service at Fontana, Calif. and many others like it throughout the country are playing an important part in the battle of production by keeping cars and materials on the move. This unit is capable of unloading all types open-top railroad cars—varying from 26 ft. to 50 ft. long; 6.8 ft. to 12 ft. high; 9 ft. to 11 ft. wide; and with capacities up to 90 tons. The number of cars it can handle in a given time depends upon the switching and track facilities for supplying loaded cars and removing empties. A full cycle of dumping and returning to normal position is accomplished in 1¾ minutes. The whole operation is so simple, automatic and foolproof that unskilled labor can perform it readily; it is completely under control at all times and can be stopped instantly at any point of the cycle. Send for Book No. 1004.

⬆ Above and below: Views of the Kaiser Company's Link-Belt rotary car dumper at Fontana, Calif. This unit unloads cars of ore.

Right: Construction view ➡ taken of same dumper shortly before it was completed for service.



LINK-BELT COMPANY

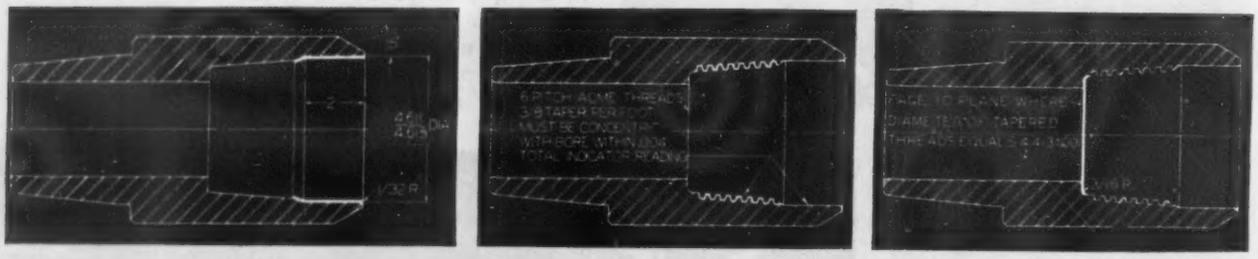
Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in principal cities.

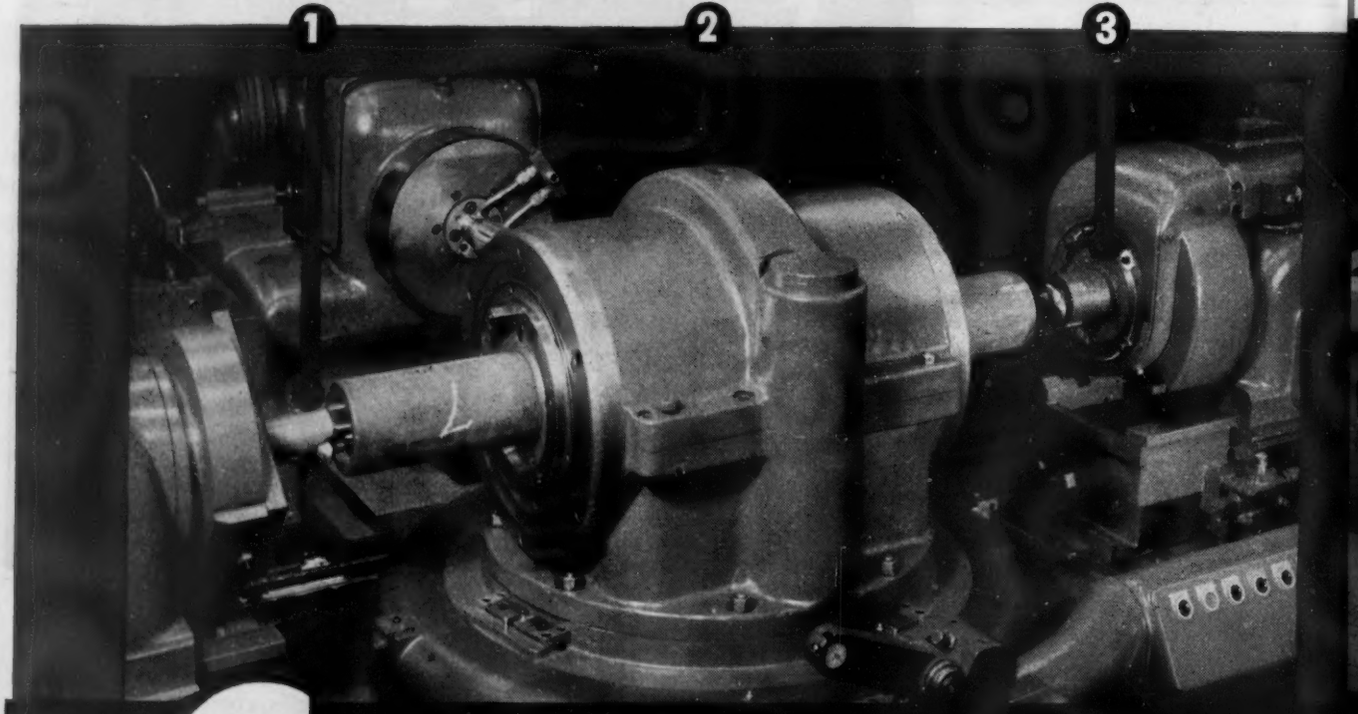
1905

Automatically

In the automatic cycle after loading, stations No. 1 and No. 3 operate simultaneously to bore and face two pieces of work at opposite ends of a central work-holding fixture . . . The fixture then indexes to station No. 2 where both the work and tool rotate to rough and finish mill the taper threads . . . During this threading cycle, the operator unloads and re-loads another piece at the opposite end of the fixture.

This Cross Special Machine is an example of the new and faster machining methods which will be the means of realizing profit in the next era of intense competition. May we help you prepare for it? Write The Cross Company, Detroit 7, Mich., Dept. 144.





CROSS

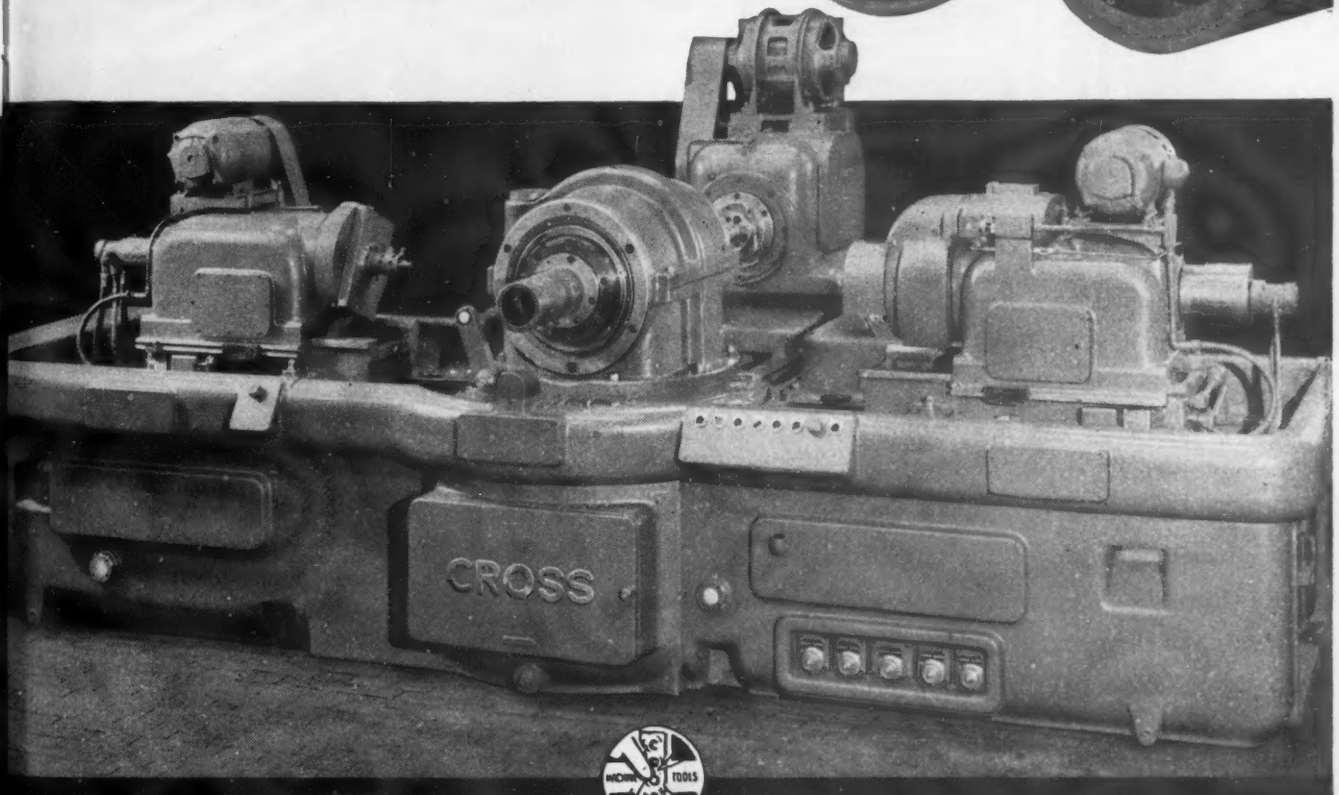
New York • Chicago • DETROIT • Cleveland • Cincinnati

Processing

OIL TOOL JOINTS

PRECISION BORING, THREADING AND FACING 16 HARDENED STEEL PIECES AN HOUR . . .

4 times faster than the former rates.



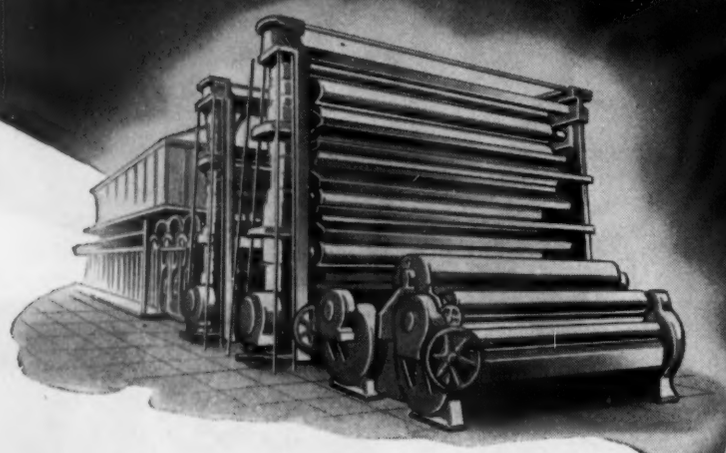
SPECIAL MACHINES

for automatically performing any one or a combination of metal cutting operations

TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

ROLLWAY RIGHT-ANGLE LOADING

LONGER BEARING LIFE OVER LONGER PERIODS OF CONTINUOUS OPERATION...



When heavy loads must be carried from 12 to 24 hours a day, let Rollway Solid Cylindrical Roller Bearings do the job. They'll stand up longer, require less service attention. The reason is simple—*right-angle loading*. That means the loads are simplified, too. Broken down into their two simple components of pure radial and pure thrust—each carried on a separate bearing assembly at right angles to the roller axis! There are no oblique loads, no compound resultants; the unit pressures per roller are substantially reduced and the life expectancy of the bearing is relatively increased.

Select Bearings Carefully

Every field of general industry has its own bearing problem. No single type of bearing will prove adequate for every kind of industrial application. Let our specialists help you to select the proper bearing for your needs.

ROLLWAY BEARING CO., INC.
Syracuse, N. Y.
1908-1945

ROLLWAY CYLINDRICAL ROLLER BEARINGS

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

A few simple rules to conserve carbide tools

FIRTHITE FIELD SERVICE POSTERS are available for display in your plant

KEEP 'EM SHARP!
OUCH!
FIRST AID
HANDLE 'EM WITH CARE!
IT'S BEST TO BABY 'EM!
Carbide tool cutting edges should be protected so that they do not come in contact with other tools or metal parts except when cutting. It is best to provide wooden, partitioned boxes for storage. Use plastic dip or tape on the tips.
FIRTH-STERLING STEEL COMPANY
'EM CORRECTLY
THANK YOU SIR!
WHEN GRINDING DON'T USE TOO MUCH FORCE
HELP!
Don't exert too much pressure against the abrasive wheel when grinding carbide tools. If the wheel is right, light pressure will remove metal at a suitable rate. Too much pressure causes overheating and may
BE SURE TO USE THE PROPER TOOL!
FOR SIZE
FOR SHAPE
FOR STYLE
FOR TIP
Carbide tools operate at higher speeds than other metal-cutting tools. Carbide tools always be larger than the steel or alloy they replace. Also, make sure they are correct style, shape, and grade.
FIRTH-STERLING STEEL COMPANY
GRIND 'EM PROPERLY!
TOOL GRINDING RULES
Grinding rules for carbide tools are easily available and should be followed carefully. The right wheel, running in the right direction, preserving correct angles are some of the things to watch. Don't guess—grind carbide tools according to rules.
FIRTH-STERLING STEEL COMPANY

FIRTHITE

The conservation of carbide tools through proper handling and correct usage is essential not only in war time but at any time for best production results and low operating costs.

These Firthite field service posters will help remind your plant operators in simple, easy-to-take, understandable manner, of the right way to make carbide tools do their utmost.

Fill in and mail the coupon for your set of these free, 17" x 22", four-color posters.

Firth-Sterling
STEEL COMPANY
OFFICES: McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES

FIRTH-STERLING STEEL CO., Dept. S—McKeesport, Pa.

Please send us without obligation on our part_____sets of Firthite Field Service Posters which we wish to display in our plant shops.

NAME_____TITLE_____

COMPANY_____

ADDRESS_____

A "PROD" to Production

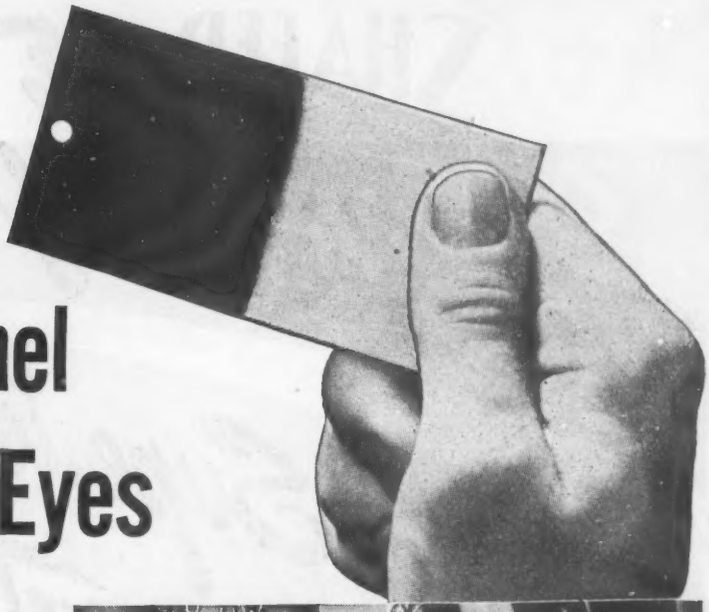
ASSEMBLY-"WISE" SPRINGS

BARNES-made springs fall into perfect step with other parts on your production lines —fitting into place with a minimum of effort or time. That's because—once engineered and set-up for production, rigid controls govern every step in forming and heat-treating to maintain uniformity.

Barnes methods are geared to the great production lines of the nation—with facilities to meet continuous or emergency requirements. Here, in one organization, is everything you'll need for spring service: experimental laboratories, engineering skill, tool design, production testing, modern heat-treating, special finishes, and, of course, special machinery to produce the springs to your schedule.

Like the modern service station—it's one stop for spring production—*Barnes*.

WALLACE BARNES COMPANY DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT, U. S. A.



This Test Panel Will Open Your Eyes

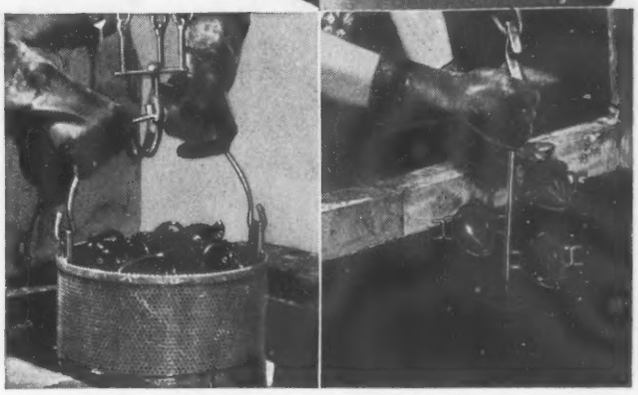
Let it show you how quick-applying, quick-drying Iridite stymies corrosion on zinc and cadmium

COUPON below will bring you a free zinc plated panel, half of it protected by Iridite. Give the whole panel any corrosion tests you and your technicians wish—and then note how the Iridite-treated half resists corrosion.

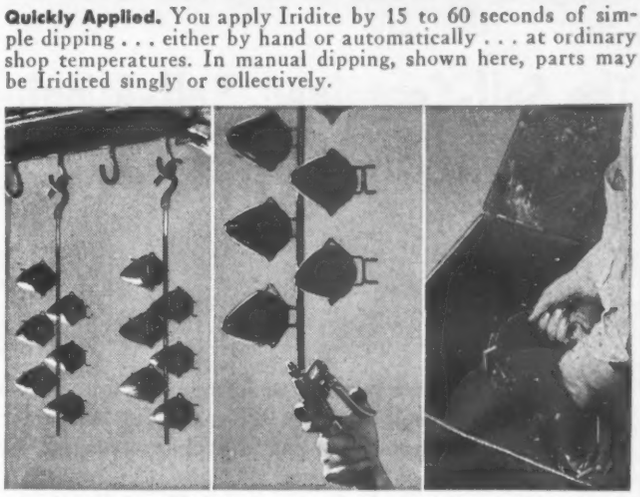
Then picture Iridite doing the same job on your cadmium plated, or zinc die cast, plated or galvanized products. Use it as paint base, and they'll hold their paint permanently. Use it as final finish, and its attractive colors will boost your sales.

Many big manufacturers already specify Iridite. Once you've made this comparison test, so will you. Coupon follows.

Mail This Coupon for Test Panel ➡



Quickly Applied. You apply Iridite by 15 to 60 seconds of simple dipping . . . either by hand or automatically . . . at ordinary shop temperatures. In manual dipping, shown here, parts may be Iridited singly or collectively.



Quickly Dried. Iridited parts may be dried in a few seconds by centrifuge, compressed air or oven, can be immediately handled, packed, shipped.

RHEEM RESEARCH PRODUCTS, INC.

IRIDITE*

Standard Oil Bldg., Baltimore 2, Md.

Branches—570 Lexington Ave., New York 22; 20 E. Jackson Blvd., Chicago 4; 2411 Slobel St., Los Angeles 31. Distributors in: Waterbury; Grand Rapids; Detroit, Cleveland; Los Angeles; Long Island City; St. Louis.

* Patent applied for

RHEEM RESEARCH PRODUCTS, INC.,
206 Standard Oil Building
Baltimore 2, Maryland

GENTLEMEN: Please send me a free panel of Iridite-treated zinc plate for laboratory testing and full information and operating details.

Name.....

Company.....

Address.....

Keep faith with your fighters and yourself—Buy War Bonds for Keeps

SHAFER "DE" 22000 Bearings

The Secret of their Superior Self-Alignment

The Self-Contained, Self-Aligning Self-Centering ROLLER BEARING with Raceways like a Ball

The secret of superior bearing performance is found when you combine the self-aligning, self-centering characteristics of a ball with the load carrying characteristics of a roller. The secret of superior bearing performance is *yours* when you specify Shafer ConCaVex Self-Aligning Bearings. Only Shafer *patents* make possible the exclusive advantages of the ball and roller combination in their construction. This unique principle was created by Shafer a quarter of a century ago and to date it has established bearing performance records thousands of users claim have no equal. Only bearings of the Shafer basic design are inherently immune to end and radial thrust, to misalignment and shaft deflection, to load shocks.

Ask the men who use them. SHAFER BEARING CORPORATION, 1418 West Washington Blvd., Chicago 7, Illinois.

1. SHAFER "DE" 22000 SERIES
The self-contained bearing, preadjusted, ready to install. Has one piece outer race, two rows of rollers and single inner race for compactness. Maximum capacity.

2. SHAFER DOUBLE ROW BEARING ASSEMBLY
for building into machines, power transmission equipment, etc. Two outer races, two roller assemblies. A single inner race.

3. SHAFER SINGLE ROW BEARING ASSEMBLIES
One outer race, one row of rollers, one inner race. Self-aligning with radial and thrust load capacity.

SHAFER CONCAVEX

SELF-ALIGNING ROLLER BEARINGS

Reg. U. S. Pat. Off.

Loading at the open hearth.

Steelcar

"Rolling Trunnion" AIR DUMP CARS

Dependably Serve this Large, Modern Western STEEL PLANT

Approaching the waste dump.

Moving to a full dumping position.

being dumped,—note clean, unobstructed discharge.

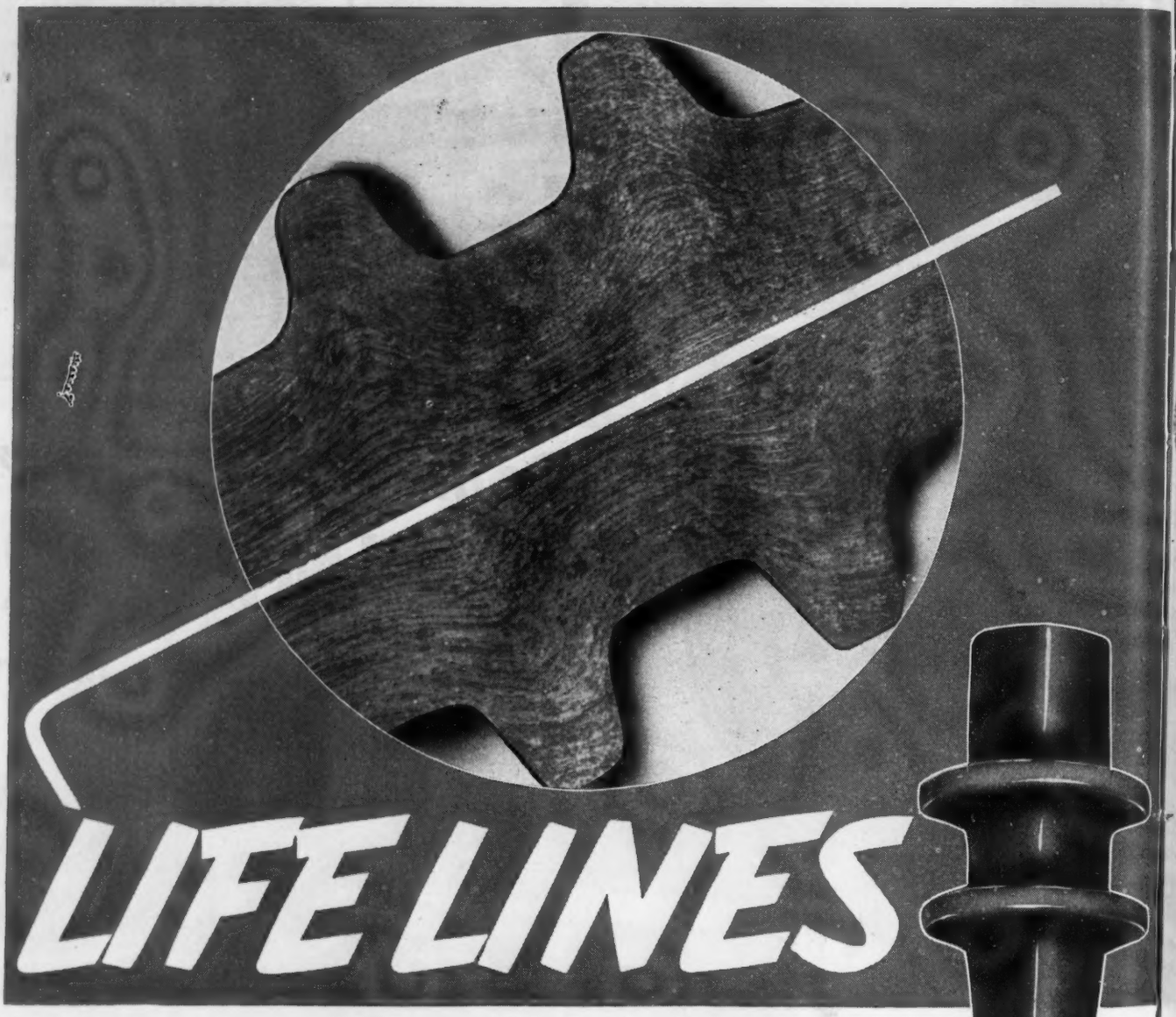
- ★ Speedily handling open hearth and general waste materials
- ★ Dumps to either side of the track in seconds
- ★ One or all cars can be dumped at one time
- ★ Dumping control from any point in the train or from the locomotive
- ★ Easy dumping—by turning small air valve handle
- ★ Loading—40 cubic yards—level; 60 cubic yards—normal
- ★ Load carrying capacity—90 tons

Designers and Builders of Railway Cars Since 1898

PRESSED STEEL CAR COMPANY, INC

INDUSTRIAL DIVISION

PITTSBURGH, PENNSYLVANIA



LIFE LINES

THERE ARE several grades of steel commonly used in forgings. Each has its specific characteristics and each will develop its maximum degree of strength and toughness when the drop forging process is correct in every detail, from the scientific design of the die to the final exacting tests of the forging itself.

This photomicrograph of a Forging by Phoenix tells the story. Note how the lines of flow follow the contour of the part and are concentrated at those points receiving the greatest shock and stress. No wonder that Forgings by Phoenix can be depended upon for extra strength, stamina, and long life. Phoenix drop forging brings out the maximum strength and toughness which any specific grade of steel may afford.

In planning your new product, you'll find it worthwhile to consider the use of Forgings by Phoenix. We'll be glad to discuss such plans with you . . . without any obligation on your part.

Forging Division of

PHOENIX MANUFACTURING COMPANY

CATASAUQUA PENNSYLVANIA

Forgings by **PHOENIX**

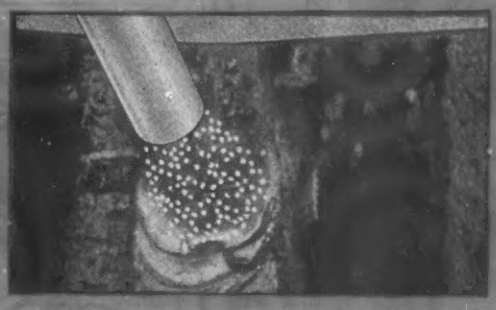
SAYS THE MAN IN THE HELMET—

"I get nice, smooth flat fillets every time with AIRCO No. 78E...

(AWS Classification E 6010)

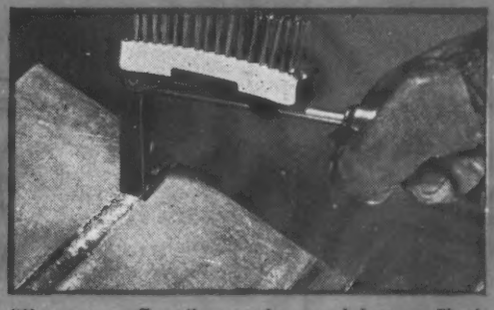
..."It's my favorite electrode for all-position DC reverse polarity welding of mild steel

"Look at that neat, flat fillet. Airco No. 78E gives that type of high quality, flat-faced fillet in all positions, and it's especially good on vertical and overhead.



"Its special coating and its fine spraying action speed up vertical and overhead fillet welds. Metal sets up rapidly and the arc is strong and forceful.

"There's no interference from slag and no deflection in the arc in any position. Deposit speeds are faster than most electrodes — weld contour is always tops.



"Slag comes off easily, another good feature. That's why I say when the job calls for an AWS E6010 electrode — and when quality, speed and appearance are important — give me Airco 78E every time."

Take a tip from the Man in the Helmet and select your electrodes for their *working ease and efficiency* as well as for their metallurgical properties.

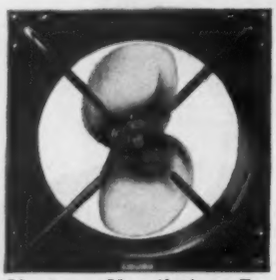
There is a complete line of Airco electrodes for every welding job. Catalog No. 120 gives full details. For a free copy write the nearest Airco office or Dept. S at the New York address. Air Reduction, General Offices: 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., General Offices: Houston 1, Texas.

Weld with **AIR REDUCTION**

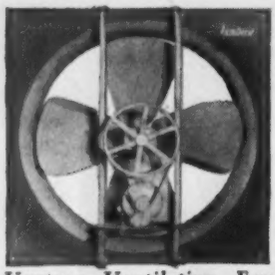
Offices in all Principal Cities

AIRCO ELECTRODES FOR BETTER WELDS AND EASIER WELDING

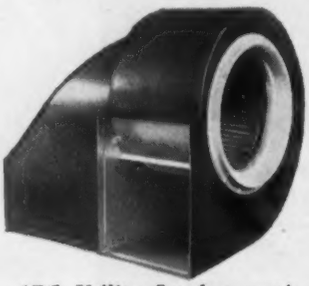
AMERICAN BLOWER



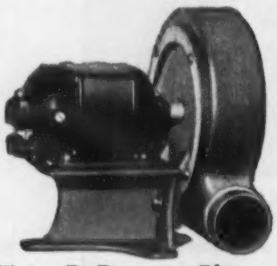
Ventura Ventilating Fan with direct connected 2-speed fully enclosed motor.



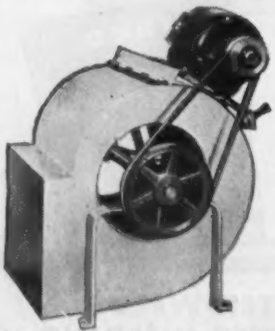
Ventura Ventilating Fan with V-belt drive.



ABC Utility Set for ventilating with a duct system.



Type P Pressure Blowers.



ACF Fan with V-belt drive.

Other fans to meet every air handling need.

The Man Who Won Favor With Management and Labor

THAT MAN is a Ventilating Contractor. He has just proved good ventilation is good business.

AND HE has won favor with management and labor by removing bad air, dangerous gases, dust and odors from the plant. No wonder the plant manager wants to place a picture of this popular Ventilating Contractor in the directors' room.

YES, you've guessed it! He and thousands of other top Ventilating Contractors use American Blower Air Handling Equipment. Regardless of what industry you are in, Bad Air is Bad Business.

CALL IN a local Ventilating Contractor today—he'll do your job better and more economically.

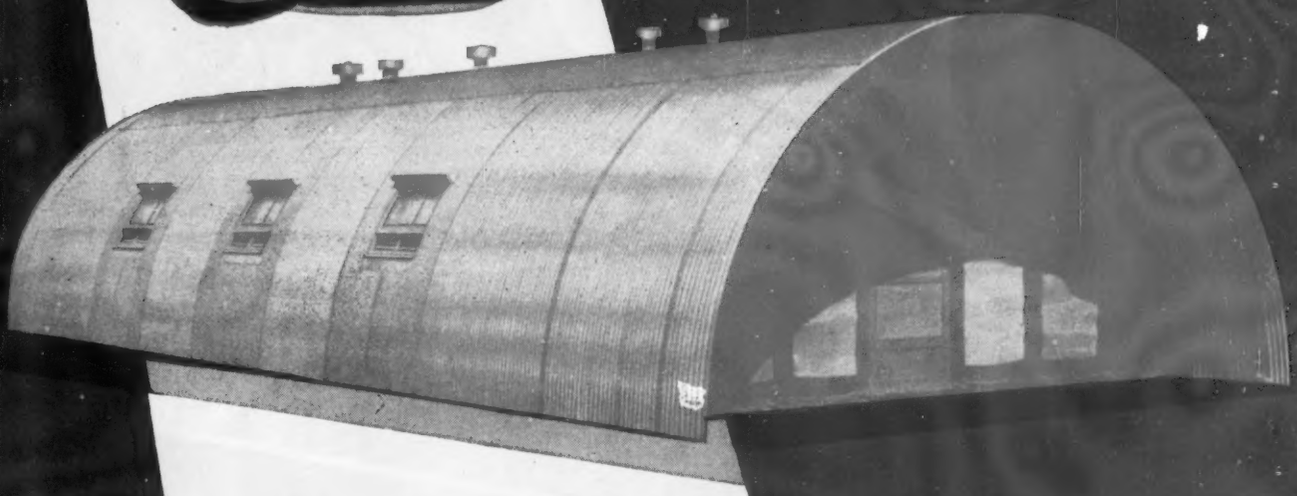
AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT, MICH.
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONT.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Our products are vital in the famous–

Quonset Hut



SERVING WAR'S NECESSITIES AROUND THE WORLD

Unique in the history of warfare is the famous Quonset Hut—an all-purpose, arch-ribbed building providing shelter for many diverse activities in war areas, even including churches and a bank.* Manufactured solely by Great Lakes Steel Corporation, Detroit, for the Navy, these Stran-Steel framed buildings have been supplied by the tens of thousands. Quickly erected, easily demountable, the Quonset Hut employs at many essential points the products of our company, for dependable, sturdy service!

**The Navy's celebrated Bank of Guam is housed in a Quonset Hut.*

FOR:
HOSPITALS
SHELTERS
BARRACKS
SHOPS
WAREHOUSES
BARNS
and endless other uses

PITTSBURGH
SCREW AND BOLT CORPORATION
PITTSBURGH, PA.

GARY SCREW & BOLT DIVISION · GARY, IND.
AMERICAN EQUIPMENT DIVISION · NORRISTOWN, PA.

TENSION RIGHT...EFFICIENCY HIGH... MACHINES PRODUCING...ALWAYS

WITH THIS F. L. A. T. DRIVE

You always *know* belt tension is right on a Flat Leather Automatic Tension drive. The pivoted motor base regulates tension automatically — high when the load is heavy, low when the load is light. There is no gradual, undetected slackening of the belt until it wears out from heat due to slippage!

Efficiency remains high above or below rated capacity (and most drives *do* run at less than rated capacity most of the time). A flat leather belt on a pivoted motor base drive operates at close to maximum efficiency from 50 to 150% of rated capacity at rated tension. Other short-center drives lose efficiency rapidly at loads either lighter or heavier than rated.

Production continues, uninterrupted, because the F.L.A.T. drive is never stopped for base adjustment.

Ask your Graton & Knight distributor for a demonstration.

Dependable, trouble-free service on a Flat Leather Automatic Tension drive is provided by "Research" Leather Belting, manufactured by processes which make it ideal for drives operating at higher speeds, over short centers and small pulleys.

Its greater pliability means it can withstand the constant flexing. Its "built-in" pulley grip means less tension required to deliver full power without slip. No idlers are necessary.

A "Research" Leather Belt on a F.L.A.T. drive will outlive a rubber V-belt on a corresponding drive by better than 2 to 1. Write Graton & Knight Company 322 Franklin St., Worcester 4, Mass., for new, free Belting Manual.

GRATON AND KNIGHT

Research Leather Belting

from Graton & Knight's line of leather belting—the most complete for all applications. Manufactured under one control from green hide to finished product. Branches and distributors everywhere. Look under "Graton & Knight" in "Belting" section of Classified Telephone Directory or THOMAS' REGISTER.

Advertisement JUNE, 1945

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

Cold Heading for Greater Efficiency, Wide Range of Engineering Alloys Available

To conserve material and reduce manufacturing costs, many items such as screws, solid and hollow rivets, bolts, nuts and fastenings of all sorts have long been made from wire or rod by cold upsetting and cold extrusion processes. Threading, where necessary, was generally performed by cold rolling. Since very little, if any, machining is required, wire for this purpose must be extremely malleable and ductile in addition, of course, to possessing satisfactory strength and stiffness. Most important also are layout of operations, design of tools and skillful metal craftsmanship.

With the development of more powerful cold heading machines that permit the manufacture of larger and more difficult items than is possible with lighter equipment, many other articles besides fastenings can be made, by cold forging which were formerly made by other methods of manufacture. Frequently cold forgings are replacing castings with great improvement in strength and wear resistance.

Fortunately, non-ferrous metallurgical research has anticipated mechanical advancements in machinery. In addition to a wide range of brasses with varying amounts of copper, with and without lead and tin, high strength engineering alloys of the silicon bronze type such as Duronze I, and Duronze V are now available. Cold headed parts, therefore, can be made to the highest engineering requirements—great strength, wear and fatigue resistance, freedom from failures due to stress corrosion cracking. Pole line and marine hardware, valve stems, hexagon nuts, screws, wire and cable connectors, etc., etc., and other important parts for engineering items are therefore being made by cold forging.

Bridgeport has made a specialty of supplying wire of the correct temper, surface finish and composition necessary to meet the severe requirements of modern mass production methods. Heading wire must be of special high quality—free from scratches, folds, blisters and similar imperfections which are not important when the wire is used for other types of operations. Otherwise cracks and breaks will appear on the surface especially where the original material has been upset to larger diameter. Also the wire must be extremely malleable so that it will fill out the die without developing dangerous shearing stresses involved in making bolts or rivets with large heads. At the same time, it must be of the correct temper so that the finished bolt, for example, will be stiff and strong on the shank.

Listed in table form are eleven alloys which will meet most requirements and specifications. The services of our Laboratory are freely offered to help in the selection of the most suitable alloy.

High Brass—16— (approximately 65% copper, 35% zinc). Very ductile and malleable. Special temper and surface. Most popular of the heading wire alloys. Used for making all types of machine, wood and cap screws, solid and hollow rivets, special fastenings.

70-30 Brass—37—(approximately 70% copper, 30% zinc). Slightly more ductile

(*Continued on page 2, column 2*)

ROD AND WIRE ALLOYS FOR COLD HEADING

	High Brass 16	70-30 Brass 37	Low Brass 5	Red Brass 85	Coml. Bronze 25	Light Leaded Brass 43	Low Leaded Brass 41	Naval Brass 45	Duronze I 813	Duronze V 609	Phono Electric 840
ANALYSIS											
Copper %	65.0	70.0	80.0	85.0	90.0	65.0	63.0	60.0	97.6	98.0	98.6
Lead %						.3	.75				
Tin %								.75	1.4		1.4
Zinc %	35.0	30.0	20.0	15.0	10.0	34.7	36.25	39.25			
Silicon %									1.0	2.0	
MECHANICAL PROPERTIES											
Ten. Strength psi { Hard*	65,000	65,000	62,000	59,000	50,000	65,000	65,000		80,000	80,000	65,000
Ten. Strength psi { Soft	50,000	50,000	46,000	41,000	40,000	50,000	50,000	57,000	45,000	45,000	40,000
Elongation, % in 2" { Hard*	25	25	12	12	13	25	15		12	12	10
Elongation, % in 2" { Soft	60	60	50	48	50	60	50	47	50	50	40
PHYSICAL CONSTANTS											
Melting Pt. (Liq) °F	1710	1750	1830	1880	1910	1710	1700	1650	1940	1940	1970
Density, lbs./cu. in.	.306	.308	.313	.316	.318	.306	.306	.304	.317	.316	.321
Coeff. Ther. Exp./°F 77°F to 572°F x10-6	11.3	11.1	10.6	10.4	10.2	11.3	11.3	11.8	9.3	9.8	9.9
Thermal Conduct. Btu/sq. ft/ft/hr/°F@68°F	67	70	81	92	109	67	67	67	35	27	120
Elec. Cond. %IACS @68°F Soft	27	28	32	37	44	27	26	26	13	9	48
Mod. of Elas. (Tension). psi	15,000,000	16,000,000	16,000,000	17,000,000	17,000,000	15,000,000	15,000,000	15,000,000	17,000,000	17,000,000	17,000,000
FABRICATION PROPERTIES											
Machinability Rating**	30	30	30	30	20	50	60	30	30	30	20
Cold Working	E	E	E	E	E	E	G	F	E	E	E
Hot Working	P	F	F	G	G	P	P	E	E	E	G
Hot Working Range, °F		1350–1550	1500–1650	1450–1650	1400–1600			1200–1500	1300–1600	1300–1600	1450–1600
SPECIFICATIONS											
A. S. T. M.	B134 Alloy #7	B134 Alloy #6	B134 Alloy #4	B134 Alloy #3	B134 Alloy #2			B21 Gr. A	B98 type B B99 type B	B98 type B B99 type B	B105 Gr. 40
Federal	QQ-W-321 Gr. A&B	QQ-W-321 Gr. C						QQ-B-636a Gr. A	QQ-C-591a Class B	QQ-C-591a Class B	
Navy								46B6k			
Army			57-217A		57-171						

*Hard temper values are for wire of commercial hard drawn temper suitable for cold heading.
**Machinability Rating—Free Cutting brass—100.
E—Excellent G—Good F—Fair P—Poor

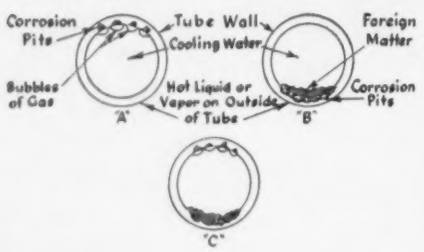
COPPER ALLOY BULLETIN

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

PREVENTING THE ACCELERATION OF CORROSION BY REDUCING THE HOT WALL EFFECT

Since we last discussed (December 1944 issue of the Copper Alloy Bulletin) the acceleration of corrosion by the hot-wall effect, numerous questions have come up about the practical applications of the suggestions offered to increase service life by offsetting this effect. Briefly the mechanism of the hot-wall effect consists of the formation of hot spots under bubbles of gas which are repeatedly formed at the same points. The bubbles of gas acting as heat insulating barriers hinder the liquid from cooling the metal surface and the resulting local high temperature accelerates the rate of corrosion. In addition, deposits of foreign matter (rust, certain types of silt, etc.) may also permit a local high temperature to develop under the deposit.



In figures "A" and "B" the effects of bubbles of gas and porous deposits are shown in horizontally held heat exchanger tubes where the heat is moving from the outside surface towards the inside surface of the tube.

Frequently both bubbles of gas and deposits of foreign material will separate from the corrosive liquid leading to the condition illustrated in figure "C". Since the rate of corrosion is increased by high local temperature every effort should be made to maintain as low a temperature as possible and keep continued, uninterrupted heating down to a minimum.

Cold Heading

(Continued from page 1)

than brass heading wire. Used for making exceptionally large heads and certain types of hollow rivets.

Low Brass—5—(approximately 80% copper, 20% zinc). Light golden color—very malleable, more resistant to stress corrosion cracking and general corrosion than yellow brass. Used for jewelry findings, parts with large upset heads.

Red Brass—85—(approximately 85% copper, 15% zinc). Rich golden color. For ornamental jewelry, special rivets and fastenings for vanity cases, lipstick holders. Very malleable. Has good corrosion resistance.

Commercial Bronze —25— (approximately 90% copper, 10% zinc).—Bronze color, resists season cracking. Recommended for outdoor construction.

Naval Brass—45—(approximately 60% copper, 0.75% tin, balance zinc). Used for cold heading bolts for U. S. Navy requirements.

Low Leaded Brass —41— (approximately 63% copper, 0.75% lead, balance zinc). Used where cold heading and such machinability as drilling, reaming, threading, slotting, tapping is required.

Light Leaded Brass—43—(approximately 65% copper, 0.3% lead, balance zinc). For operations requiring good cold heading with light machining.

Duronze V—609—(approximately 98% copper, 2% silicon). Does not fail from stress corrosion cracking. Exceptionally malleable even in its hard drawn condition. Excellent for making all types of screw products by cold upsetting and roll threading. Recommended for making bolts with exceptionally large heads. Tensile strengths of finished bolts average above 100,000 lbs. per square inch. When properly made, it is not necessary to provide heat treatment of the finished cold upset items to relieve stresses. Fine for outdoor construction where brass and steel are not satisfactory. For cap and machine screws, bolts, cold upset nuts, wire and cable connectors, pole line and marine hardware, water meter bolts, valve parts, etc.

Duronze I — 813 — (approximately 97.6% copper, 1.4% tin and 1% silicon). Resists season cracking and corrosion from sea water. Similar in physical properties and applications to Duronze V.

Phono-Electric—840—(approximately 98.6% copper, 1.4% tin). Has an electrical conductivity approximately 40% that of pure copper. Very malleable—stronger than copper. Used for pole line hardware and electrical parts where strength, toughness, corrosion resistance from weathering and good electrical conductivity are needed.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Automatic Controls are reported for built-in application on machine tools to provide feed and sequencing in any combination that includes not more than forty functions in a complete cycle. Initial setup for automatic operation is made at the time an operator puts the equipped machine through the movements required by a given work piece. The machine will then duplicate these movements including rapid traverse, feed, indexing, speed changing in any combination to the maximum total of forty. **No. 612**

An Emulsion Lubrication Apparatus is reported to form a new type emulsion which will greatly increase the life of machine tools and the speed at which they can be operated. The anti-corrosive and anti-friction effects can be obtained by emulsions as dilute as 98 parts of water to 2 of oil. It is claimed a unit can be designed to any tank capacity whatever. **No. 613**

A Retracting Tool Holder that mounts on a lathe carriage in place of the usual tool post and carries a bit or a boring bar is reported. The bit or the bar is held in a pivoted head on the side of the holder so the head rocks the tool away from the work when a supporting latch rod is withdrawn from beneath it. **No. 614**

An Electronic Detector is said to warn of mercury vapor in the atmosphere to protect workers in the manufacture of chemicals, electrical apparatus, glass, and in metal mining and smelting for dangerous concentrations. It is claimed to read 1 part per billion. **No. 615**

A New Band Saw Blade designed to cut soft brass, aluminum; and other soft metallic and non-metallic materials is reported. Considerable space between teeth is said to provide the room for chip clearance required by these materials. The blade can be supplied to fit any standard band saw-machine. **No. 616**

A Work Positioner for welding, grinding, and parts assembly has been made available. It mounts a 16-in. table that can be rotated through a complete circle. Tilted through a range of 150 deg. and locked at a desired angle. It has a weight capacity of 100 lbs. **No. 617**

A New Flexible Tube Assembly acts, it is claimed, as an expansion joint in a rigid pipe line. It consists of a flexible metal tube welded in place between standard brass pipe nipples. The units are available for ¼ to 2-in. pipe lines. **No. 618**

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT 2, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,* for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers, oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

"Bridgeport" BRASS

Established 1865

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware: *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

COPPER WATER TUBE.

FABRICATING SERVICE DEPT.—Engineering staff.

BRASS AND COPPER PIPE

Note: Bridgeport products are supplied in accordance with existing priority regulations.

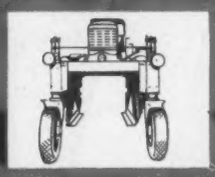
*Trade name.

BRIDGEPORT ARMY E NAVY **BRASS**

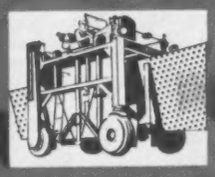
PNEUMATIC TIRED... STRADDLE CARRIERS

PIONEERED BY ROSS

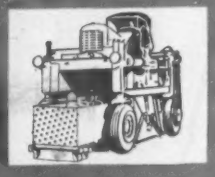
Capacities: 1 to 12 Tons



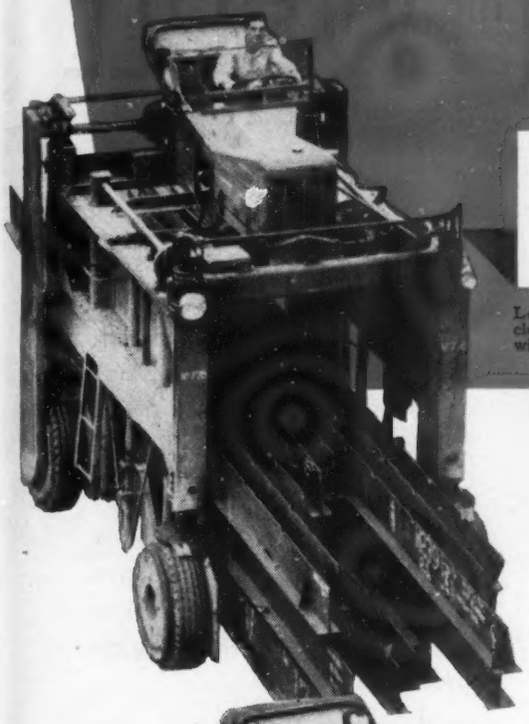
Load hooks open and close by vacuum power with finger tip control.

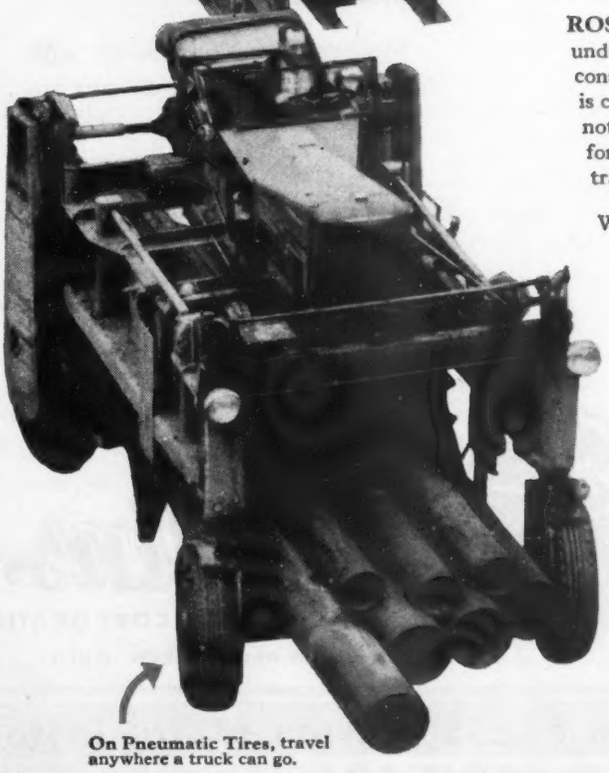


No load-length limits. Long pieces balanced over center, protruding at both ends.



Castings and small parts handled in boxes or pallets.





On Pneumatic Tires, travel anywhere a truck can go.

The ROSS Straddle Carrier Truck, with high capacity tire equipment, is made in several sizes to handle all kinds of heavy, bulky or extra long materials or products... within buildings, between buildings or over the road at truck speed.

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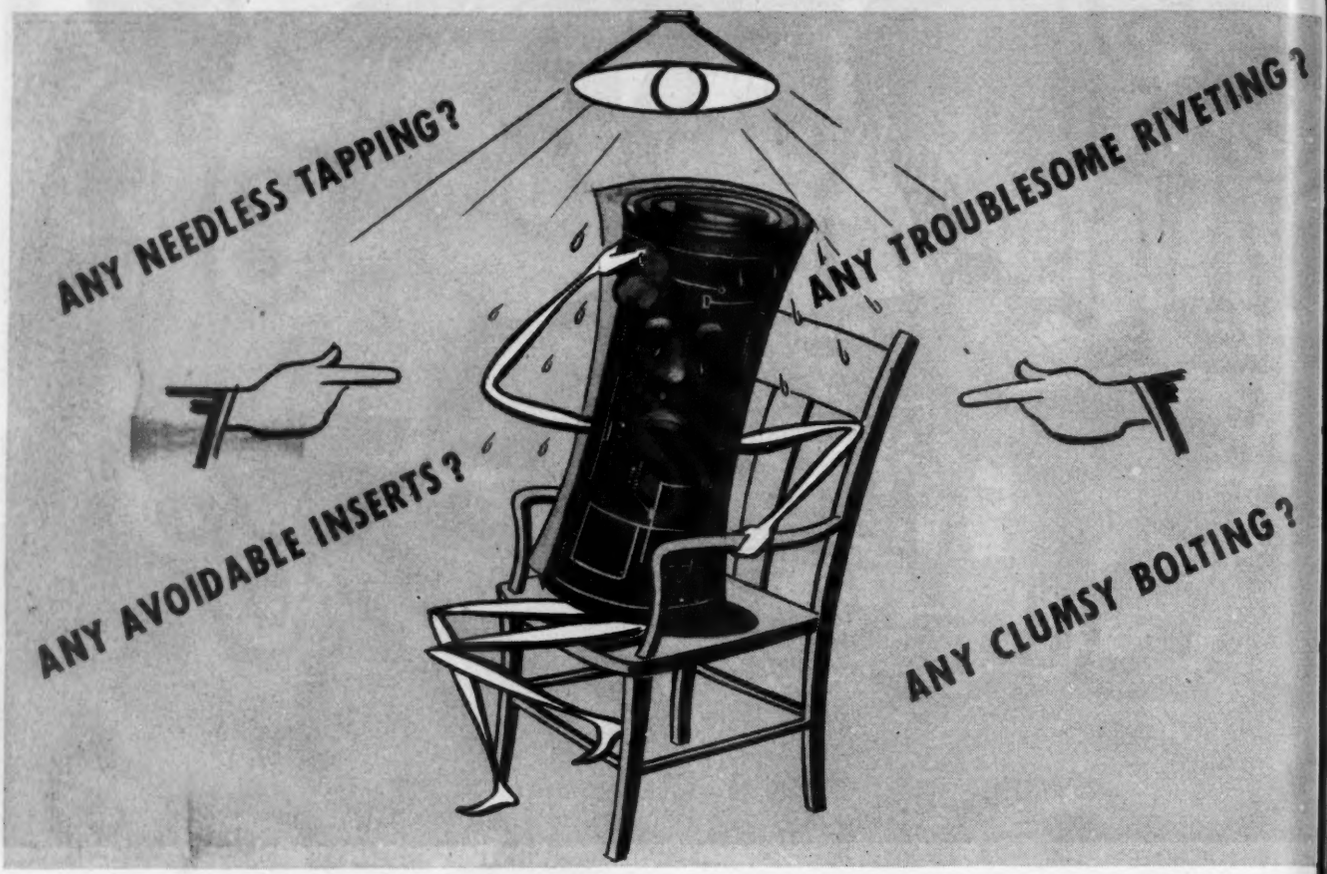
Give your Assembly Plans the THIRD DEGREE



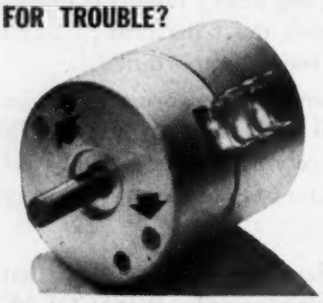
...*before* you set up for post-war products

SAVINGS UP TO 50% in assembly time and labor costs have been made by thousands of manufacturers when they switched to the short cut fastening method – Parker-Kalon Self-tapping Screws.

YOU CAN START SAVING when you start production if you question every fastening *now*, while your plans are still in process. Why wait to find fastening "bugs" later, when a change now requires only a little pencil work.

WHATEVER MATERIAL you are working with – plastics, die castings, sheet steel, aluminum, brass, fibre – in 7 out of 10 cases you'll find you can save with P-K Screws, and improve your product as well!

WILL YOU BE ALL TOOLED UP FOR TROUBLE?



The Daven Company, Newark, N. J., makers of radio and electronic equipment, says, "We had loads of trouble tapping sheet brass . . . couldn't get good, clean threads, especially with unskilled help.

"Now in these attenuators, we fasten the aluminum cover to a brass stamping, .065" thick, with P-K Type "Z" Self-tapping Screws, and our trouble is ended. Besides eliminating tapping and speeding the work, the P-K Screws form threads that are near to perfection, hold securely."

Find "bugs" like this beforehand in your product — save the needless cost of tooling up for trouble!

P-K SELF-TAPPING SCREWS save by eliminating the tapping and tap expense necessary for machine screws, and the slow fumbling with bolts and nuts. They also eliminate costly insert in plastics, and riveting in hard-to-reach places.

ASK A P-K ASSEMBLY ENGINEER to check over your plans with you to make sure you find all the fastening "bugs". Or, mail us assembly details for recommendations. Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.

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Quality-Controlled
SELF-TAPPING SCREWS

FOR EVERY METAL AND PLASTIC ASSEMBLY

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-no matter how severe the fabrication-

Republic ELECTRO PAINTLOK

Here's something you've been looking for—a steel sheet with a zinc coating that really sticks to the base metal.

You can draw, form, stamp, spin, roll, shear or otherwise work Republic ELECTRO PAINTLOK Sheets—without cracking, peeling, powdering or flaking of the zinc coating. And that's not all. The combination of electrically-applied zinc and subsequent chemical treatment provides exceptional paint adherence—and thus solves an old and troublesome problem.

If you manufacture products involving severe fabrication of a zinc coated sheet or the application of paint to a zinc coated surface, Republic ELECTRO ZINC PLATED Sheets will enable you to make them better—*and probably at lower cost.* For further information, write to:

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Republic Electro Zinc Plated Sheets include ELECTRO PAINTLOK in widths up to 60 inches and gauges from 12 to 24, and ELECTRO ZINCBOND in widths up to 48 inches and gauges from 25 to 37.

Republic

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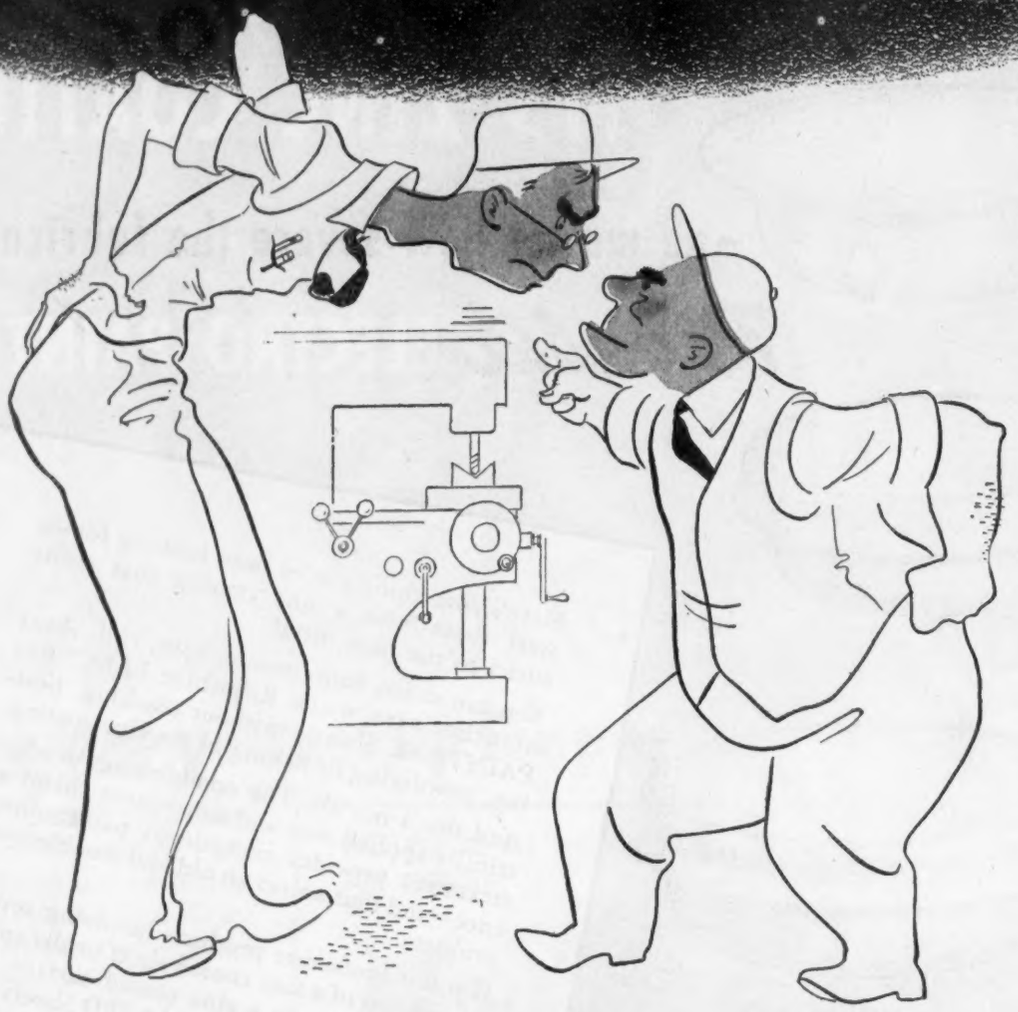
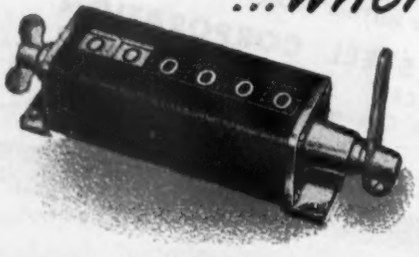
You Can Always Count on Arguments



...where there is no COUNTROL



Foreman Fred just caught it hot from the super, for the parts shortage in final assembly. Now Operator Ozzie swears *he* wasn't short . . . he *knows*, because he personally counted every part produced on his machine.

So it goes . . . round and round . . . and gets nowhere. Nor is it Ozzie's fault. *For he can't be counted on, as long as he has nothing to count on.*

But it's a quick, easy and inexpensive matter to *give* him something to count on . . . a Veeder-Root Counting Device that can be installed on his machine without interrupting his production . . . a compact device to count the machine's units of performance (turns, strokes, etc.) mechanically or electrically. Then there'll be no jam-ups or delays . . . and no room for argument, because the Facts-in-Figures will be there, in bold black and white, for anyone to see at any time . . . so machines can be kept up to schedule. *That's* what it means to keep everything under Veeder-Root *Count*ROL.

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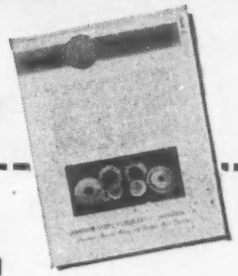
LEBANON'S series of straight chromium stainless steels . . . 12% to 30% chromium range . . . are highly valuable wherever their physical, machining and corrosion-resistant characteristics economically meet service conditions . . . and where nickel as an alloying element may be objectionable.

Choice of five alloys in this Lebanon group makes possible the selection of the right steel for any specific service condition within a broad general range. Substances successfully handled by castings of these various Circle Ⓛ straight chromium stainless steels include nitro cellulose, nitrated compounds, alcohol, ammonia, fruit juices, lubricating oils, steam, soap, lye, vegetables, fresh water, vinegar, salt spray, organic chemicals and acids, fused salts, non-ferrous metals and certain sulphuric acid solutions.

Correct selection of alloy for the particular service conditions is, of course, an essential. This is best done through consultation with a Lebanon metallurgist or foundry engineer.



NEW BULLETIN

Describes all five Lebanon Circle Ⓛ Straight Chromium Stainless Steels. Shows Chemical Analyses and Physical Properties at a glance. Write for free copy today.

Lebanon Circle Ⓛ 11. 18% to 20% Chromium; .30 Carbon Maximum

Lebanon Circle Ⓛ 12. 12% to 14% Chromium; .12 Carbon Maximum

Lebanon Circle Ⓛ 13. 12% to 14% Chromium; .25 Carbon Maximum

Lebanon Circle Ⓛ 14. 21.50% Chromium; 1% Copper; .30 Carbon Maximum

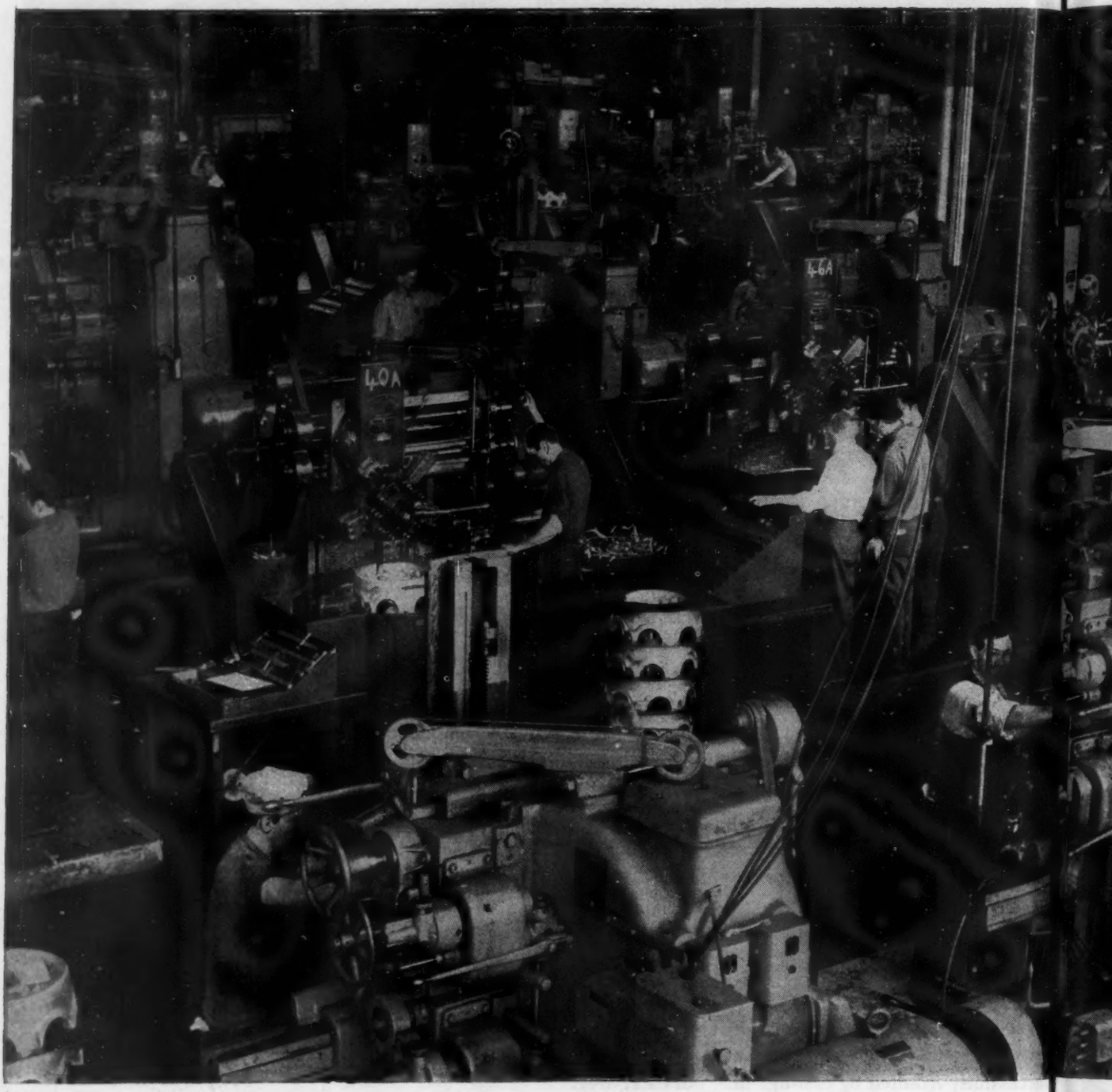
Lebanon Circle Ⓛ 15. 26% to 30% Chromium; 1.5% Nickel Maximum; .30 Carbon Maximum

LEBANON STEEL FOUNDRY LEBANON, PENNA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHANOTTE) METHOD

Lebanon ALLOY AND STEEL Castings

RUST



TUNE IN THE
TEXACO STAR THEATRE
WITH JAMES MELTON
EVERY SUNDAY NIGHT
—CBS

TEXACO

TEXACO

PROOFING

GOVERNMENT-OWNED PRODUCTION EQUIPMENT

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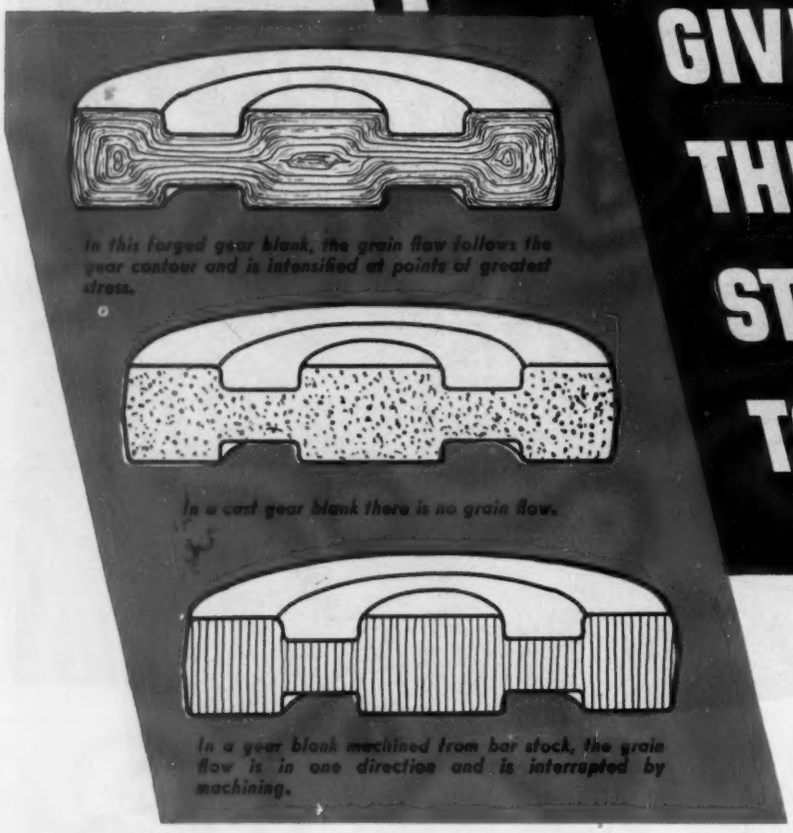

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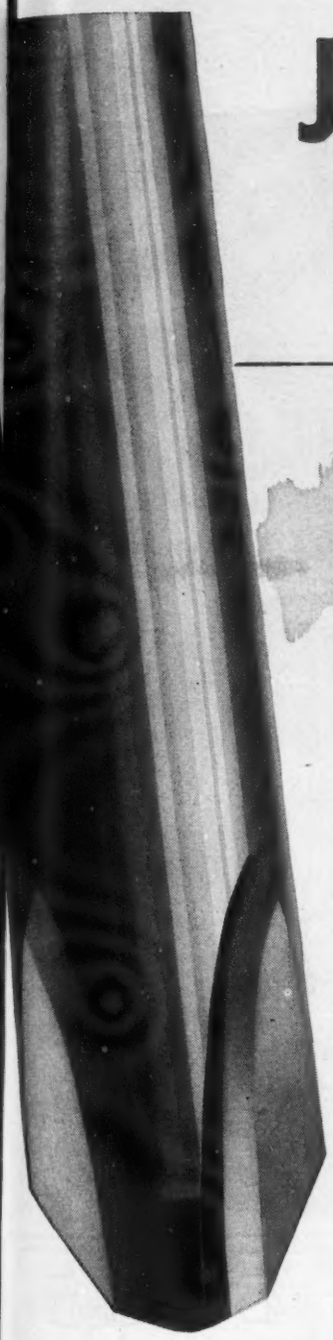

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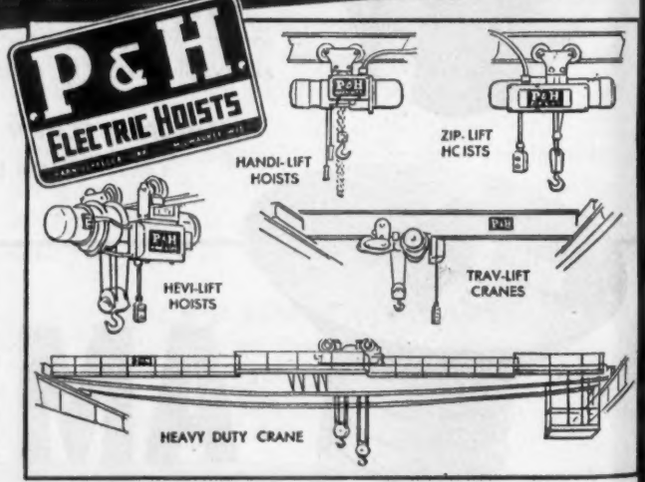

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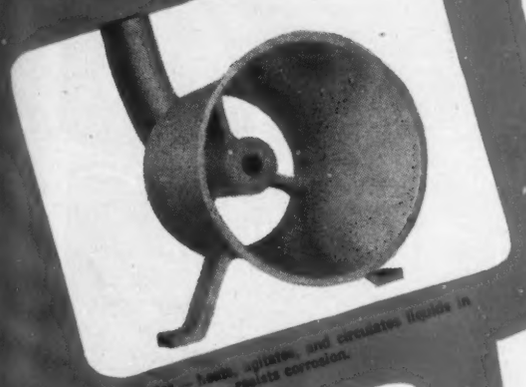

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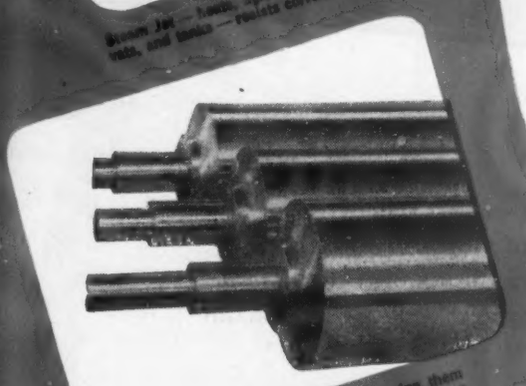

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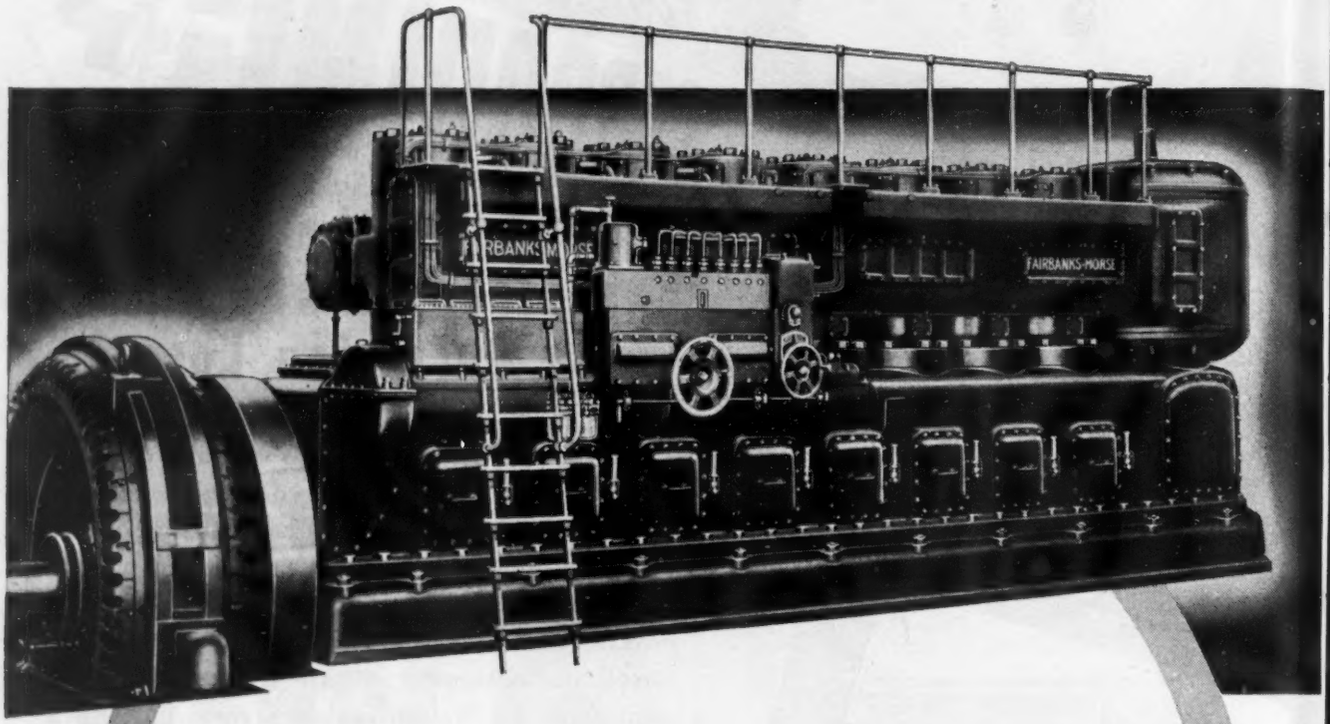

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STEEL

The Magazine of Metalworking and Metalproducing

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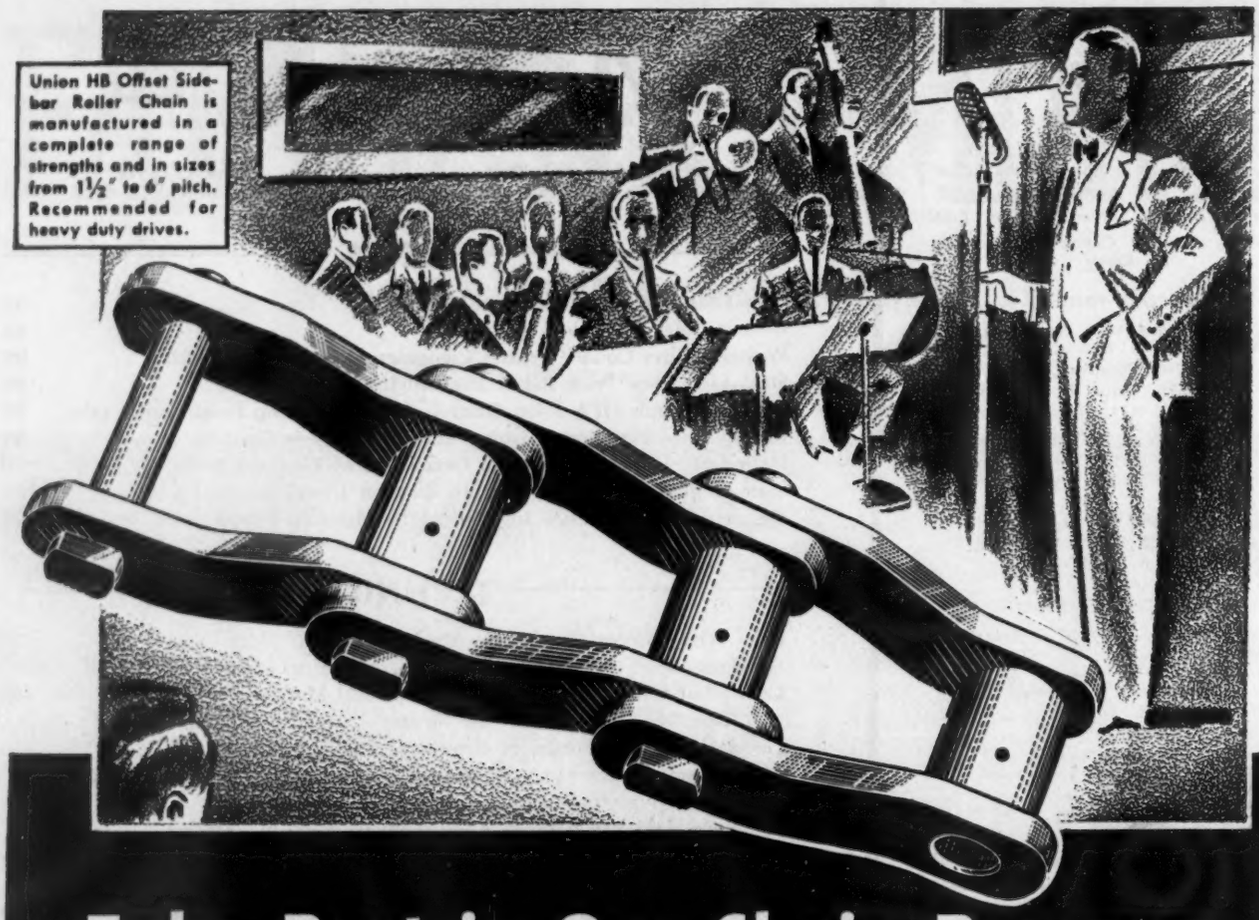

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UNION CHAINS

STEEL
June 11, 1945

Healthy for Industry?

Reports from Washington indicate that the House Small Business Committee is receiving a large volume of mail from small manufacturers and merchants. An analysis of the letters shows that the writers fear "that the postwar competition of large distribution outlets such as manufacturer-owned retail stores, chain and mail-order houses will increase and make it definitely hazardous for many small, locally-owned, retail firms to engage in or stay in business."

Many industrialists will recognize in this complaint the familiar outcry against the chain stores by independent merchants, but it may be worth while to consider whether or not it carries implications for industry. Would circumstances which tempt small industrial units to sell out to large manufacturers be considered wholesome?

Recently a small fabricator was relating his difficulties. He does a business of more than $2,500,000 annually. His purchases of steel are sizable enough to make him a valued customer of two integrated producers. During the past two decades this fabricator has suffered the torture of depression and enjoyed spurts of prosperity. In recent years he has been plagued more and more by the difficulties of carrying on his business under government regulations. Right now he is concerned because he, as chief executive of the small business, is required to spread his attention too thinly over numerous important matters. He must serve as government contact man, tax expert, renegotiation conferee, employe relations conciliator, WLB and salary stabilization expert, principal in contract termination and in numerous other capacities requiring highly specialized knowledge and experience.

He has been thinking that because the size of his business does not permit hiring executives to specialize in these jobs, and also inasmuch as he sees steel companies buying up other local, independent enterprises, perhaps he might be better off personally if he were to accept one of the offers occasionally made to him by steel companies to purchase his business. He reasons that he could remain at his post as an employe, but with assistants to relieve him of much of his present too-thinly spread effort. He would be free of many of the headaches which now confront him.

We doubt whether this particular man will sell his business. He likes it too much. However, the conditions which make him consider selling are conditions affecting thousands of small manufacturers.

Are circumstances which tempt owners of small industrial units to sell out to the big ones healthy for industry as a whole?

FOREHANDEDNESS PAYS: Many headaches incidental to reconversion can be avoided if war contractors will use a little foresight in anticipating the inevitable. There are two things, among others, that can be done right now to minimize confusion later on.

One is to work out a pretermination agreement with the proper Army or Navy authorities. Pretermination agreements, similar to those now being negotiated with 19 steel companies, already have proved themselves. They save precious time. For example, Ford Motor Co. entered into a pretermination agreement on a contract involving $139 million. This forehandedness enabled the company to clear plant, dispose of inventory and shift from production on one war item to another in 28 days. Without this termination planning, the shift would have required months.

The other thing to do is to cancel orders for controlled materials promptly as soon as a cutback occurs or a contract is terminated. Because many contractors have failed to do this, steel mill order books show hundreds of thousands of tons of steel for third-quarter delivery which are fictitious. This is

(OVER)

a serious threat to the reconversion program because it tends to obscure the actual amount of steel available for civilian goods production.

Co-operation all along the line now will facilitate reconversion months hence when the going will be rough. —pp. 92, 100

• • •

AMATEURS IN NEW ROLE: America's position in world affairs following V-J Day will demand a realistic handling of the problems of international trade. This nation's record in this respect following World War I was pretty bad and the prospect now is not too encouraging. The chief difficulty lies in the fact that never having relied heavily upon foreign trade and therefore lacking seasoned experience in it, we now are seeking to get into it in a big way at a time when its problems are more complicated than ever before.

Thus we witness efforts to extend the Trade Agreements act to permit greater flexibility in raising or lowering tariff rates, proposals to stockpile strategic raw materials as an aid in balancing exports and imports and the formation of "The Business and Industry Committee for Bretton Woods Inc." to express industry's views on monetary, financial and economic problems involved in international trade.

We need all the light and expert counsel on foreign trade we can get. We are amateurs in a new role. —pp. 103, 104, 118

• • •

SURVIVAL OF FITTEST: Observers of manufacturing methods in the automobile industry believe they detect a long-range tendency toward cutting down the man hours of labor involved in forging and machining operations, reducing the amount of metal which must be removed and thereby slashing the net cost of fabricated parts. They conclude that the industry is turning away from "expensive machining operations" and of trying to find other, quicker methods.

It is true that these tendencies are in evidence, but it would be a mistake to assume that these efforts to achieve greater efficiency will alter appreciably the use of forging and machining equipment. The constant rivalry between various processes and machines forces improvements. Past, present and future advances in forging and machining technique will tend to offset inroads by alternative or competing methods.

The law of survival of the fittest obtains in industry, but it seldom eliminates a worthy contender. —p. 107

POSTWAR HORIZONS: Wartime developments in jet propulsion and gas turbines may be paving the way for far-reaching changes in transportation during the next decade. At a conference sponsored by ATSC of the Army Air Forces and General Electric Co., the consensus of opinion among the 200 engineers in attendance was that jet propulsion and gas turbines would develop swiftly into the basic power units of both military and civilian aviation. One speaker (p. 114) envisioned low priced private planes powered by gas turbine-driven propellers, helicopters with jet propulsion gases emitted from the trailing tips of the propeller blades and large commercial freight and passenger lines using planes powered by gas turbine propeller power plants . . . . At another meeting, G. Edward Pendray, assistant to the president, Westinghouse Electric Corp. said (p. 116) that "new postwar industries will spring from this enormous wartime development of rockets, rocket motors, jet propulsion planes and gas turbines. The size of the new industries will depend largely on the progress our engineers and scientists are able to make during the remainder of the war" . . . . Soviet architects and engineers have outlined to American contemporaries (p. 104) Russia's program for constructing 25 million dwelling units in the next decade . . . . Stressing the importance of efficient sales in the postwar period, L. S. Hamaker, assistant general sales manager of Republic Steel Corp., told Worcester sales executives (p. 113) that "any company that has on hand or within reach 50 per cent of its prewar sales force is in an excellent position" . . . . Through means of mechanical improvements on wire rewinding lines and the adoption of electronic control of drives (p. 144), Gilmore Wire Rope Division of Jones & Laughlin Steel Corp. has tripled production and gained other advantages over the former group wire rewinders . . . . Unless an unexpected increase in the demand for steel plates from West Coast shipyards develops soon (p. 94) the Geneva steel plant is expected to close in September . . . . Postwar program of General Electric Co. will increase its research staff from 540 to 800 persons (p. 119) and involve the erection of a new research laboratory to cost $8 million . . . . An important report on "Steel Expansion for War", prepared by W. A. Hauck of the Steel Division of WPB (p. 97), will be digested in next week's issue.

E. L. Shaner

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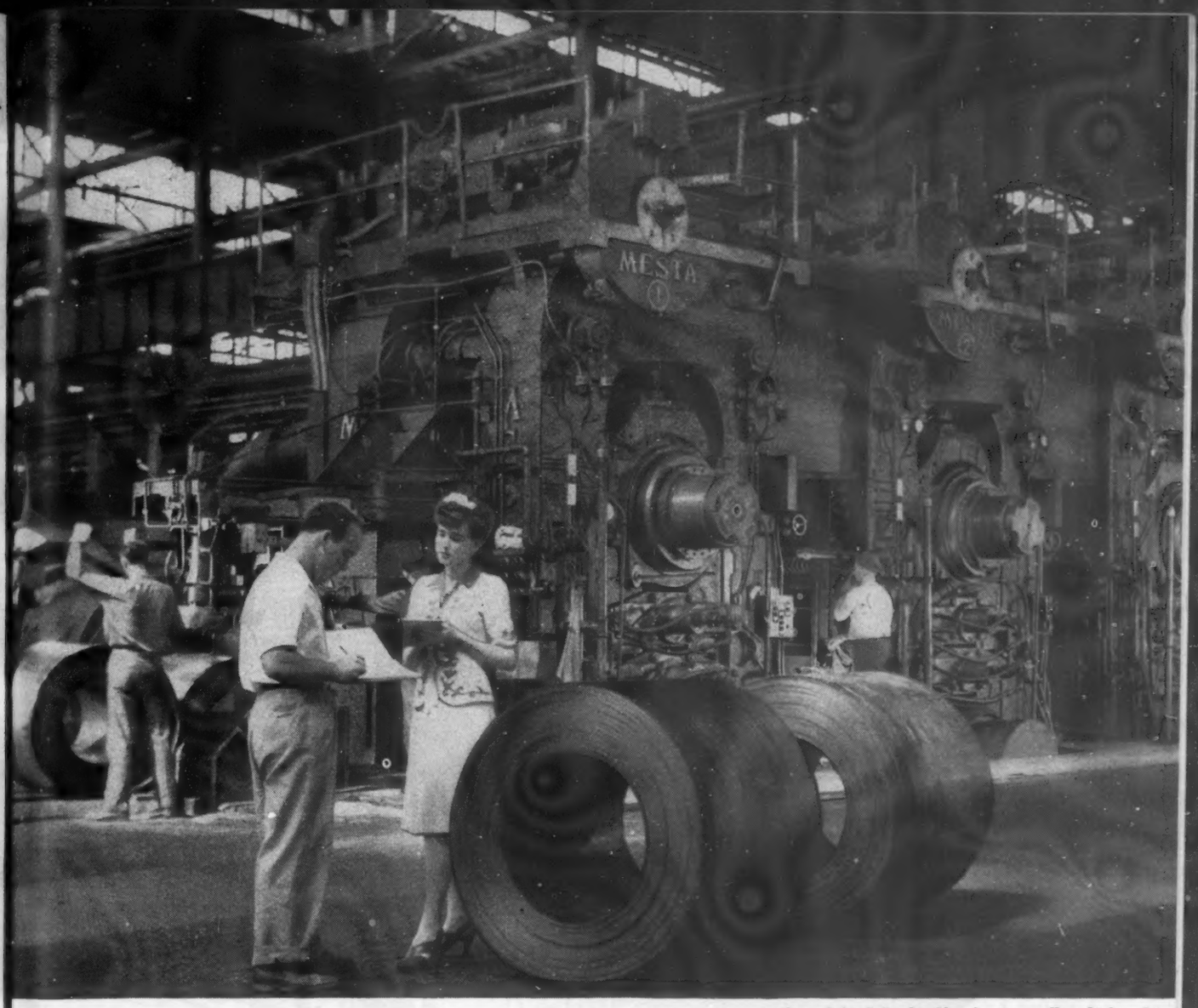

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New Cutbacks May Free More Steel

Allotments for civilian uses for third quarter increased 3.6 per cent. Some "free" material to be available. Automakers unveil first interim models. Ford expects to begin manufacture within 60 to 90 days

HEAVY new cutbacks in military production, reported to be in the making in Washington, are expected to free substantial amounts of materials and manpower for civilian goods production by next month. The new cutbacks are said to involve $2.5 billion in the Army Service Forces 1945 program and include most of the hard items used by the ground troops—trucks, tanks, guns, ammunition and communications equipment.

Manufacturers are scheduled to receive cancellation orders or instructions to reduce production over the next ten days and actual output will begin to feel the effects of the cutbacks late in June and on a larger scale in July.

This is a development for which manufacturers ready to resume civilian lines and War Production Board officials in charge of reconversion have been awaiting. To date, reconversion has made slow progress due to the scarcity of materials and manpower and many of the programs for civilian goods formulated by WPB have been predicated on the expectation of large cutbacks by the armed forces.

WPB officials hope the forthcoming cutbacks, combined with those already announced, will ease bottlenecks on the critical materials, especially steel sheet and strip, and that these materials can be released in greater volume for building automobiles, refrigerators, washing machines, stoves and similar items.

In advance of announcement of the ASF cutback, third quarter allotments of steel for domestic nonmilitary end uses were increased 330,000 tons over such allocations for the first quarter this year, the last full quarter of the two-front war.

Although these allotments for civilian uses represent an increase of about 3.6 per cent over the first quarter level, they do not represent any increase for most domestic programs. Only those programs where essentiality is clear have received the larger allotments. These include: Farm machinery, containers, oil country goods, buses, trucks, railway passenger cars, construction components, such as plumbing, heating equipment and builders' hardware.

The only two civilian items not previously allotted steel which are included in the third quarter program are refrigerators and washing machines. Programmed production of 350,000 washing machines and 265,000 refrigerators for the third quarter have been authorized.

These allotments were based on WPB's expectation that the supply of steel for the third quarter will continue at about the same levels as in the two previous periods, roughly 14,309,000 tons of carbon steel and 1,839,000 tons of alloy steel.

In addition to the steel allotted to essential production, there will be about 500,000 tons of "free" steel available to industry during the third quarter. "Free" steel may be purchased on the open market without priorities and subject only to WPB's inventory restrictions. This

tonnage of "free" steel probably will be increased by the new cutbacks.

Small industries (those producing $50,000 worth of items each quarter) will be aided in the purchase of free steel by being allowed to place an AA-4 priority rating and a Z-3 allotment symbol on their purchase orders. This means that before any big purchasers can buy free steel, mills will have to fill the rated orders placed by the small manufacturers.

In the passenger automobile industry, regarded by many as the bellwether in reconversion, there exists an underlying optimistic tone over ability to obtain the necessary sheet and strip for initial requirements. Parts releases now in the hands of suppliers call for first shipments around July 2, indicating confidence that basic materials will be in the plant by that time.

Now being circulated in Detroit are surplus property listings of the Detroit Loan Agency. One of the latest, list No. 33, covers semifinished steel only, and includes 16 mimeographed pages of some 350 separate items aggregating well over 3000 tons in all. Products available include nearly all forms of hot and cold-rolled carbon and alloy squares, wire rods, rounds, bars, strip, sheets, plate, tubing and tool steel.

It is believed by some that if this much surplus material is available in the Detroit region alone, the other 22 regional agencies must also have considerable quantities, which in turn could reflect an early easing of allegedly tight situations in new steel products, notably sheet and strip.

CHOKEPOINT

One of the greatest threats to the reconversion program is widespread failure of contractors to cancel orders for controlled materials no longer needed for war contracts which have been terminated or cut back. Mills have on their books for July, August and September shipment rated orders for hundreds of thousands of tons of steel products no longer required due to terminations or cutbacks.

War Production Board officials report this is increasing the difficulty of finding steel for companies reconverting to civilian goods production. They feel if the situation is not remedied it will delay reconversion and contribute to an acute unemployment problem soon. A "flying squad" of 400 men in WPB field offices will urge terminated and cut-back contractors to cancel orders for unneeded material promptly. The Army also is requesting its steel procurement officers to undertake a similar campaign.

Recognizing the effects of progressive war material cutbacks, the Detroit WMC Office has removed practically all manpower controls affecting workers in that area, making Detroit the first major war industry center to be so relaxed. Specifically, the following have been removed: Employment ceilings on employers; the priority referral procedure of USES; the 48-hour work week, and the need for statements of availability for anyone except a person leaving an essential job. The latter exception may also be removed by June 15.

Packard has notified suppliers its original orders and shipping schedules are now released, with "X-day" specified as June 1, and shipments to start at various intervals from this date.

Ford officials have indicated production can be started in 60-90 days, with the proviso materials will be available. This prediction is regarded generally as optimistic, although there is also a considerable volume of opinion leaning to the belief the industry will produce well over its initially assigned quota of 216,000 passenger cars during the remainder of this year.

Ford was the first manufacturer to release pictures of the new model cars, which show no radical departure from the past in styling, although differing appreciably from the last of the 1942 models. The trend toward styling exemplified in the 1941 Pontiac and certain Hudson models was unmistakable in the first hand-built 1946 Ford.

Various publicity men from other manufacturers are "sitting" on photographs of their interim models, in most cases awaiting approval of their company heads for releasing them.

Steel producers generally are a little less optimistic than manufacturers of consumers goods concerning the availability of steel for civilian goods. Mills generally are booked solid through the third quarter on rated tonnage and in many instances well into the fourth quarter. Unless cancellations develop rapidly, the open-ending of the Controlled Materials Plan July 1 may not permit the delivery of any considerable tonnage of steel to civilian manufacturers.

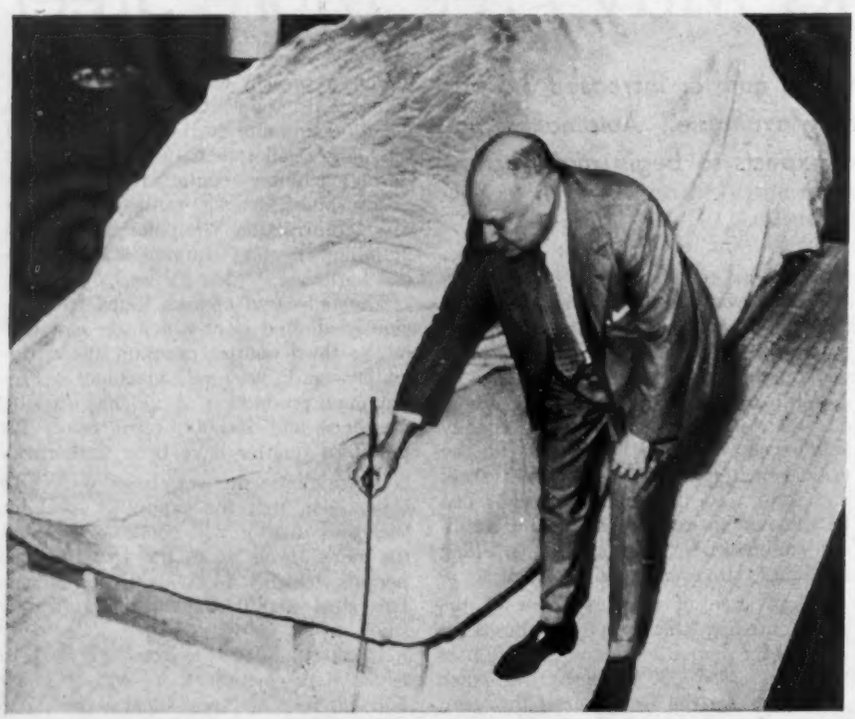
Full Rolling Capacity Used

Where cancellations have been made as result of cutbacks in the armament programs, the rolling capacity thus released generally has been taken for some other urgently needed material.

Inland Steel Co., Chicago, has outlined the change in CMP regulations and its effect on the probable availability of steel in a letter to customers which fairly summarizes the situation for most mills:

"Controlled Materials producers are permitted to deliver 'unrated' orders after June 30, 1945, if material is available after providing for all properly authorized CMP orders.

"Controlled Materials producers must defer delivery of 'unrated' orders to the extent necessary to make deliveries on time of all Authorized Controlled Materials Orders or other orders which they are required to accept. However, when an 'unrated' order is scheduled for delivery within less time than the lead times of Schedule 3 to CMP Regulation



Joseph W. Frazer, chairman, Graham-Paige Motors, checks measurements on a preliminary model of the company's postwar car. Mr. Frazer says the car will be entirely new and will seat six persons comfortably. NEA photo

1, the producer need not defer such an order.

"An 'unrated' order as defined in the CMP amendment is any order other than an Authorized Controlled Material Order or an order a producer is required to accept by written direction of WPB.

"Our backlog of CMP tonnage has not changed appreciably since V-E Day, and as a consequence our current schedules and those for the third quarter at present contain only CMP tonnage. Our ability to deliver 'unrated' tonnage in this period will of course, depend on the extent to which this backlog of authorized and directed tonnage in each particular product is reduced and the rate at which this reduction materializes. Similarly for the future it is impossible at this time for us to determine what our position will be, as it is entirely predicated on the requirements of the program covered by WPB allotments or priority protection.

"You may be assured that it is our desire to co-operate with you to the fullest extent possible and that we will keep you informed of any changes which may influence our ability to produce 'unrated' tonnage."

Conversion Allotments Canceled

WPB announced changes applicable to steel producers on and after July 1 when CMP will be open-ended. Direction 71 to CMP regulation 1 outlines procedure for a producer to obtain steel for further conversion effective July 1. WPB will no longer issue further conversion allotments to producers not operating under production directives for steel for further conversion which had been approved on Form CMP-4b. All such allotments for third quarter and thereafter are canceled effective June 1.

The directive explains how a producer not operating under production directive may use the further conversion allotment symbol to replace material used in filling authorized controlled material orders and that production directives under which certain producers operate will be adjusted to reflect only the order load of authorized controlled materials orders.

Cutbacks in the munitions program and the slowness in getting started on civilian production are causing noticeable easing in the manpower situation in some areas; in others, of course, the situation remains extremely tight.

The War Manpower Commission has shifted nine areas from group 1 to group 2 ratings as labor supply and demand in these districts approach a balance.

The areas transferred to group 2: Ft. Wayne, Ind., Lima, O., Los Angeles, Morristown, N. J., Philadelphia, Pontiac, Mich., Santa Ana, Calif., South Bend, Ind., and Waterbury, Conn.

Seven labor market areas have been shifted from group 2 to group 3, where a moderate surplus exists or is anticipated. They are: Detroit, Ft. Worth, Tex., Grand Island, Nebr., Kenosha, Wis., Providence, R. I., Talladega, Ala., Lincoln, Nebr.

Muskegon, Mich., has been shifted from group 1 to group 3. Only area moved into group 1 was Asheville, N. C.

Decisions to retain or remove manpower controls in the various areas will be made on an area basis under a proposal agreed upon at a conference of national and regional labor-management committees with WMC officials in Washington. This method, instead of directives from the national headquarters, will place the primary responsibility for modification or elimination of controls upon the persons most directly affected.

Pocket unemployment has developed in some areas and revised work schedules have caused scattered strikes. Three plants of the Higgins Industries Inc. shipyards were closed down by dissatisfaction of employes over contract terminations. Brier Hill works of Youngstown Sheet & Tube Co. suffered a ten-day stoppage as maintenance workers protested a new work schedule. Industrial and political observers expect the labor situation will become more aggravated as munitions cutbacks and the transition to civilian production cause temporary unemployment to increase.

Meanwhile war contractors last week were supplied with guideposts to aid them in distinguishing between reconversion costs which can be written off as operating expenses and those which must be capitalized for tax purposes.

The Internal Revenue Bureau explained that costs incurred by a contractor in restoring his plant to prewar layout will be treated as business expenses and allowed as deductions in measuring profits subject to income and excess profits taxes.

On the other hand reconversion expenditures which either enlarge or improve facilities as compared with their prereconversion status will have to be capitalized and written off in subsequent years under the regular depreciation procedure.

The same procedure will be followed by the Army and Navy in renegotiating excessive contract profits where reconversion costs are involved.

Present, Past and Pending

■ JESSOP STEEL ORDERS 19½-INCH COLD STRIP MILL

WASHINGTON, PA.—Jessop Steel Co. has ordered a 19½-inch Sendzimir reversing cold strip mill under license agreement with the Armzen Co., Middletown, O. The new mill will have a capacity of 6000 tons annually and will be used primarily for cold rolling solid and composite stainless and other alloy steel. The mill is being constructed by the Waterbury-Farrell Foundry & Machine Co., Waterbury, Conn.

■ SENATE VOTES TO DISSOLVE FIVE WARTIME AGENCIES

WASHINGTON—The Senate last week passed by voice vote and sent to the House legislation dissolving five wartime agencies and transferring their powers and functions to the Reconstruction Finance Corp. The agencies are: Defense Plant Corp., Metals Reserve Co., Rubber Reserve Co., Defense Supplies Corp. and Disaster Loan Corp.

■ GENERAL MOTORS DELIVERS 75 CIVILIAN COACHES

DETROIT—Truck & Coach Division of General Motors last week made its first big delivery of civilian passenger coaches since the start of the war when it turned over to New York and Chicago coach operators 75 of the 45-passenger type vehicles. General Motors had orders on hand at the end of April for 5632 coaches and expected to deliver 3575 before the end of the year.

■ FRANCE'S 20-YEAR MACHINE TOOL NEEDS SET AT 200,000

WASHINGTON—France's requirements of machine tools for renewal purposes over the next 20 years is estimated at 200,000 units. This will necessitate some importations pending development of the domestic industry. About 180 companies in France were engaged in the manufacture of machine tools before the war of which only four employed more than 500 workers.

■ TOTAL OF 112 MERCHANT SHIPS DELIVERED IN MAY

WASHINGTON—Delivery of 112 ships of 1,120,594 deadweight tons in May brought merchant ship production for first five months of 1945 to 586 ships of 5,948,735 deadweight tons, Maritime Commission said last week.

■ FARM MACHINERY OUTPUT LAGS 13% BEHIND SCHEDULE

WASHINGTON—Total farm machinery and equipment scheduled by 630 large producers in the year beginning July 1, 1944, amounts to $504,140,751. As of April 30, production was approximately 13 per cent behind schedule.

Geneva Steel Operations Curtailed

Structural mill already out of production and September shutdown of plate mill appears likely with order backlog shrinking

BARRING an unexpected and unlikely increase in demand for steel plates from West Coast shipyards within the next few weeks, operations at the $200 million Geneva steel plant in Utah are expected to come to a halt in or about September.

Moreover, all indications are resumption of operations is unlikely until after the plant has been sold to private interests and facilities have been expanded and converted to produce products for which there is a civilian market.

Operation of the structural steel unit at Geneva already has been discontinued. The plate mill has enough orders to continue in operation until August at a rate of 45,000 tons monthly. Plate orders have been dwindling sharply since early this year, and virtually no government orders have been received since V-E Day. Labor from the structural mill will be transferred to the plate mill.

Without doubt the focus of most western discussions of postwar prospects, the Geneva mill's eventual fate probably will not be decided for several months. Western observers believe there is a better than 50-50 chance that it will be operated by private interests after the war. However, how successful a venture it will be in peacetime is a matter dependent on a great many factors, such as its competitive position with established eastern plants, market possibilities, readjustment of freight rates, the trend of exports, the basis for recapitalizing the extremely high cost of construction, and the conversion of production facilities.

RFC Wants Plant To Continue

Up to now the Reconstruction Finance Corp., which holds title to Geneva, has hinted that it wants to see the plant continued in postwar operation. As for disclosing actual procedure or terms for disposing of the plant, the RFC has done nothing. Indications are that it eventually will be sold at auction to the highest bidder. Thus far three interests have signified an intention to bid—U. S. Steel, Colorado Fuel & Iron Corp. and Henry Kaiser.

Sale of the plant probably will be delayed until after the RFC has analyzed a survey now being made by a private engineering firm. This appraisal will cover all phases of the western steel situation, both as concerns Geneva and Fontana, and the other steel production facilities.

SHOWS HOUSING PLANS: R. J. Thomas, right, president of the United Automobile Workers-CIO, confers with Henry J. Kaiser in San Francisco with the avowed intent to persuade Mr. Kaiser to enter the automotive field. Mr. Kaiser declined comment on his intentions in the automotive field, but is pictured here showing the union leader some of his plans for postwar prefabricated housing units. NEA photo

Preparing Geneva and Fontana for postwar production will be costly. Estimates are that well over $100 million of new facilities will be needed. Various types of mills have been discussed, including expansion to make light sheet products including tin plate, pipes and tubes and the like. During the war, both Fontana and Geneva have been producing ship plates chiefly, and Fontana has been making steel billets for artillery shells.

No definite figure has ever been cited for expanding and converting Geneva to postwar operations. However, Mr. Kaiser has estimated he will require about $52 million for the shift-over at Fontana. The Bank of America and other western institutions have made an offer of a $60 million loan to Mr. Kaiser for this purpose, subject to refinancing of the RFC loan which Mr. Kaiser borrowed to finance Fontana's construction. This amount, originally $111 million, is expected to total $71 million when the war ends. Mr. Kaiser believes by that time he will have amortized $40 million of the total borrowing.

At conferences here recently between Mr. Kaiser and R. J. Thomas, president of the United Automobile Workers (C.I.O.), Mr. Kaiser again took the opportunity to state that an early decision on refinancing terms by the RFC is necessary for early conversion of the Fontana plant. He said that all of his postwar planning hinges on the RFC action, and decried the present delay and uncertainty. Mr. Thomas, following the conferences, said: "Kaiser should definitely get the Fontana steel plant."

Mr. Kaiser also stated that he had a $15 million eastern order for steel products, contingent on the plant's conversion.

New Plants and Expansions Total $3,602,000 in Month

Eighteen new factories were established in Los Angeles county, Calif., during April, representing total investments of $1,290,000 and employment capacity of 234 workers. Twenty-two expansions of existing factories took place during the same period, with investments for the latter of $2,312,000 and jobs for 406 workers.

Since January, new plant and expansion investments total $13,393,000.

The new industries engaged in metal working include:

Precision Oil Field Service Co., 8660 Atlantic boulevard, South Gate, to manufacture oil field drilling equipment and for maintenance of a service department.

Pacific Cutter & Reamer Co., 6611 S. Western avenue, manufacturing high-speed cutting tools.

Landgraf Helicopter Co., 8024 S. Western avenue, making a small number of helicopters and continuing experimental work.

Sheco Mfg. Co., 1913 East 64th street.

has begun production of electric welding and automatic burning equipment.

Exact-O Mfg. Co., 115½ W. Arbor Vitae street, Inglewood, making dies and tools and doing experimental work.

Gear Engineering & Mfg. Co., 509 W. Vernon avenue, making gears up to 12 inches in size.

Commercial Machine Shop Co., 720 N. Broadway, aircraft parts, dies, tools, jigs, fixtures and gages.

Fred W. Pickell & Associates 5701 York boulevard, will make dies and tools.

Chrisco Grinding Co., 2622 Hyperion avenue, external grinding.

Lorena Specialties Co., 1132 S. Lorena street, making screw machine products.

Wes-Tex Engineering Co., 1711 Standard street, Glendale, machine shop specializing in grinding gage plugs.

Among plant expansions is that of Harshaw Chemical Co., El Segundo, which has authorization to construct an antimony smelter and oxide plant for $350,000. Work is to be completed by July 1.

Doak Aircraft Co. Inc., Torrance, plant expansion.

Falcon Engineering Co., Los Angeles, additional 25,000 square feet for manufacture of aircraft parts.

California Cornice, Steel & Supply Co., 1620 N. Spring street, Los Angeles, will construct warehouse of about 20,000 square feet.

Barker Grinding Co., 5813 Wilmington avenue, Los Angeles, is constructing building with 14,000 square feet floor space.

Star Radiator Co., 647 Cores avenue, Los Angeles; 12,000 square foot addition; company makes air conditioning equipment.

Universal Metal Products, 2940 E. Olympic boulevard, Los Angeles, maker of dies, tools, metal stampings and aircraft parts; plant addition of 6000 square feet.

Irwin W. Masters Inc., 3035 Andrita street, Los Angeles, maker of tube and pipe fittings for airplanes, 4600 square foot addition.

Bone Engineering & Tool Co., 701 W. Broadway, Glendale, is erecting 3000 square foot addition for manufacture of dies, tools, jigs, fixtures and special machines.

Southwestern Machine Co., 316 Azusa street, constructing a 2800 square foot building at Los Angeles; maker of special automatic machinery.

Steel Distributor Plans New Warehouse at Seattle

Permission to construct an office and warehouse building in Seattle has been granted to A. M. Castle & Co., steel distributors, Chicago, by the War Production Board.

The company has operated a warehouse in Seattle for 30 years, and in 1942 its location was taken over by the government. Since then, the company has been operating in rented property.

Western States Council Presses Campaign for Lower Steel Prices

Committee holds prices should be based on actual costs plus reasonable profit. Confident Geneva and Fontana Plants can be operated at levels comparable with plants in other areas. Will seek reduction in freight rates

COMBINED thinking of steelmakers, consumers and other businessmen is reflected in recommendations framed by the Western States Council's Steel Committee at a recent meeting and now being sent to government leaders throughout the nation.

The committee statement is designed to bring about larger postwar quantities of steel at lower prices for the 11 western states.

Kenneth T. Norris, president, Norris Stamping & Mfg. Co., Los Angeles, and chairman of the committee, has announced that copies of the recommendations are being sent to senators, congressmen, the Reconstruction Finance Corp. and Defense Plant Corp., as well as to railroads and steel producing companies.

To achieve lower priced steel, the committee's statement points out, "The greatest single contributing factor will be elimination of the premium paid by western steel buyers during the prewar period over prices paid in other industrial centers."

The committee declares its confidence that the Geneva and Fontana steel plants can operate at a production level as high, or higher, than the average for the steel industry as a whole.

Would Include Price Policies

Sale contract of the government-owned mill at Geneva and adjustment of the loan at Fontana should include declarations of price policies to be put into effect by the mill operators, the recommendations point out.

These price policies should be based on costs plus a reasonable profit and should not include phantom freights or other factors unrelated to actual costs.

On the fiscal futures of the two plants, the recommendations make clear, "If the government should attempt to realize full 100 per cent return on its investments the mills would remain idle because the capital investment per ton of capacity would not permit operation in a competitive market."

For the Geneva mill to operate in the postwar period, the recommendations continue, freight rates on finished steel from the mill to western markets must be substantially reduced in advance of disposition of the mill.

In summarizing, the committee held: "Studies as to possible production costs at the two plants lead to the conclusion that lower western prices, with attendant industrial growth, can and will be attained."

Job Openings Expected in Civilian Industry on Coast

Delegation of authority to the Los Angeles district office of Office of Price Administration to set prices on new civilian products manufactured in Southern California will result in 75,000 new job openings for men and women workers recently laid off in war plant cutbacks, Harold Wright, general manager of the Chamber of Commerce, predicted last week.

Heretofore, makers of an estimated 2000 civilian goods items have applied to the Washington OPA for prices on both new and improved products.

Other relaxations deemed necessary for return to peacetime production commensurate with the continuance of needed war production are listed by the chamber as follows:

Classification of this region as a Group III stringency area instead of Group II as at present, so as to enable existing plants and numerous new businesses to utilize workers.

Immediate release of materials for consumer production in plants now located here and in approximately 20 new industries which have committed themselves by investment to begin production when materials become available.

West Coast Ship-Repair Yards Need More Workers

Hiring rate in West Coast government ship-repair yards has not kept pace with enemy attacks on naval vessels in the Pacific, although employment increased monthly during the first four months of 1945, Paul V. McNutt, chairman, War Manpower Commission, reported recently. Employment in these yards, located in the Los Angeles, San Francisco bay and Seattle-Puget sound vicinities, rose from about 95,000 in January to more than 100,000 in April. This increase is not sufficient to repair battle-damaged ships, lines of which are waiting in the harbors of some West Coast ports for repairs, and in all West Coast government shipyards thousands of additional workers are critically needed.

Steel Price Relief Held Inadequate

Increases granted work out to actual decreases for small nonintegrated mills. Industry group reported critical of OPA policy

YEAR AFTER D-DAY: Wrecked German and American tanks stand side by side in their graveyard off Utah Beach, Normandy, a year after American forces stormed the beaches of France to open the western front. Disposal of the scrap is one of the many reconstruction problems. NEA photo

CONSIDERABLE speculation as to the course of steel prices over coming months is following in the wake of the recent action of the Office of Price Administration permitting advances of $2 to $7 per ton on 14 specified products.

Whether OPA will push its price study with a view to effecting compensatory price decreases on other products is uncertain since industry earnings are likely to be adversely affected over coming months by shrinkage in war demand and increased costs attending reconversion.

Profit margins of most steelmakers have been due largely to volume war business. With the change in product demand, continued high production costs and controlled prices, the profit position of the industry may deteriorate rapidly.

Inadequacy of the price relief recently granted the industry is reported to have been voiced at a recent meeting of the OPA General Steel Products Advisory Committee. Two resolutions bearing on the price situation in the industry are said to have been adopted.

One resolution, it is reported, points out the recent increases do not maintain the profit margins on the products specified which prevailed between Oct. 1 and Oct. 15, 1941 as directed by the price control act. Further, the resolution is said to hold that the increases fail to cover total costs of production of the products involved; that they do not comply with the OPA product standard as outlined to Congress, being based upon an arbitrary modification of that standard, that is, being measured by average manufacturing cost rather than by the out-of-pocket cost of the highest cost non-marginal producer.

The resolution, it is reported, goes on to declare the increases were determined on the basis of an understatement of average manufacturing cost, since no allowance was made for the estimated cost of the elimination of intra-plant inequities, ordered by the National War Labor Board. This cost, currently accruing, is retroactive to around Jan. 1, 1944, and since, in contravention of the statutory mandate that costs be computed in accordance with established accounting methods, profits on raw materials which go into the manufacture of steel products within an integrated company have been credited against the cost of those steel products, and emergency amortization over normal has been excluded from manufacturing costs though the writing off of such wartime investment is provided by statute.

Claims Price Increases Inequitable

The resolution is understood to declare the price increases are not fair and equitable to many semi-integrated and nonintegrated companies in that they are based on average costs arrived at by including the material costs of integrated companies on an integrated basis, instead of being based on the spread between the ceiling prices of materials and finished products, upon which the semi-integrated and nonintegrated companies must depend; also, that OPA failed to increase ceiling prices of certain finished products in relation to the price increases granted on semifinished products as a result of which many nonintegrated companies have suffered the effect of a price decrease instead of obtaining a price increase.

Concluding, the resolution is reported to hold that the increases leave the industry in an untenable financial position to face the reconversion period, since 70 per cent of production will be selling at a loss, and the loss products will constitute the bulk of production for the civilian market.

The second resolution is understood to concern the threat of OPA to effect compensatory price decreases should a study of the price structure indicate such action can be taken. Ordering of such compensatory decreases, the steel men are reported to feel, would be unwarranted, unfair, inequitable and contrary to law. The committee's resolution, it is said, points out that steel industry earnings, as a whole, are unsatisfactory, that the prices of those steel products not covered by the recent price advances are not unfairly or inequitably high, but rather are in many instances unreasonably low, and that a reduction of prices which have not risen to prevent an increase in overall industry profits resulting from required price increases on other products, is profit control and not price control. OPA has repeatedly stated to Congress its objective was control of prices, not control of profits.

The resolution is said to include a statement to the effect the matter is not a question of reducing prices which have risen unduly or of preventing increases in prices which have threatened to rise, and, accordingly, there is no authority for OPA to lower existing prices which, in the case of the steel industry, have not risen from the depression levels of 1938.

Pointing out that the price control act was designed to prevent unwarranted product price increases and not to control average industry earnings, that even the industry earnings standard as promulgated by OPA is designed to put a floor under total earnings and not to require that total earnings be held down to any particular level, the resolution is reported to state that if OPA were to superimpose a new compensatory price decrease formula, it would be granting

even less than the minimum requirement of law as established by its own standards.

The resolution, it is said, further states the suggestion that prices and profits of one segment of the industry be reduced in order that another segment be benefited is unfair and inequitable, that such action would directly violate the previous actions of OPA in granting product increases, and further, would merely result in further fabricators being benefited to the detriment of the industry. The resolution is said to conclude with the statement that if confidential cost figures were submitted by the industry for establishing the necessity for price increases, be used to reduce prices, the OPA would be guilty of a breach of trust.

To date most of the dissatisfaction with OPA's price action has been voiced by the small steel producers who buy semifinished steel for further processing, fabricators who must absorb the increases, and warehouses which were not permitted to mark up their prices in step with the mill advances. Such producers as the nonintegrated sheetmakers and cold-drawn bar interests have been especially hard hit. Bolt and nut manufacturers, who are estimated to consume about 2½ per cent of the ingot steel produced, also are severely jolted as are small tubemakers and steel fabricators.

Increases Actually Cause Loss

On the basis of the $2 per gross ton increase on sheet bars, the $2 per net ton increase allowed on hot-rolled sheets, allowing for scrap loss, actually works out to a reduction of 16 cents per ton for the small sheet mill. For example, one small mill obtains from a gross ton (2240 pounds) of sheet bars 1865 pounds of finished hot-rolled sheet. To produce a net ton (2000 pounds) of sheets this maker consumes about 2402 pounds of sheet bars, which brings his sheet bar cost per ton of finished sheets to $38.43 against a selling price of hot-rolled sheets of $44 including the increase of $2 per ton. This gives him a margin over his semifinished cost of $5.57. However, prior to the recent price advances his margin over semifinished was $5.73, so that at the higher price level in effect today his margin is cut 16 cents per ton.

Approximately 85 per cent of this producer's output consists of hot-rolled annealed and cold-rolled sheets. On the latter product no advance at all was allowed by OPA so that on such output the entire amount of the semifinished price advance of $2 per gross ton has to be absorbed, which really means a reduction of $2.16 per ton on cold-rolled sheets if scrap loss is included. At the same time the War Labor Board's directive of last December upping fringe wages in the industry has increased this maker's costs somewhere between $3 and $4 per ton. If only such cost factors as wages, raw materials and freight rates are taken into

(*Please turn to Page* 219)

Bowles Defends OPA Price Control; Says Profits Top Peacetime Levels

Cites data collected by Commerce Department to refute critics of OPA policies. Concedes 1945 first quarter corporate profits down from year ago but insists return in most price-controlled industries continued to rise

FOLLOWING shortly after approval by the Senate Banking Committee of legislation which would continue government price control (present law expires June 30) for another year, Chester Bowles, administrator of the Office of Price Administration, last week released a study of financial statements of 1120 leading corporations indicating that business profits, both before and after taxes, in the first six months of 1944, with few exceptions, continued far above peacetime levels.

The figures, according to Mr. Bowles, grouped industry by industry, refute statements of some critics of price control that OPA policies have worked general financial hardship on business.

"This study shows that average profits, industry by industry, range from earnings, by a bare handful, only slightly in excess of industries' prewar profits, to earnings 10 and 12 times what was realized by the industries before the war," said Mr. Bowles.

He went on to say that for corporations of all sizes in all fields, Department of Commerce studies show profits before taxes in 1943 were about 3½ times greater than in prewar 1939, and that even after the payment of high wartime taxes, 1943 earnings were more than double earnings after taxes in 1939.

"In 1944," he said, "profits before taxes continued to rise above the record-breaking 1943 level. And earnings after taxes in 1944 were about the same as in 1943 despite the increased tax rates.

"In the first quarter of 1945, corporate profits in general, both before and after taxes, were slightly below the corresponding quarter last year, but profits of most price-controlled industries continued to rise. Even after taxes, profits in most price-controlled industries have risen without interruption. This continuing uptrend in the profits of industries under price control results from the steady increase in their volume of production during a period when the output of strictly war industries has tended to level off.

"Some critics of price control, while agreeing that corporate profits have increased, state that small business firms have suffered. On the contrary, according to the Department of Commerce, profits of unincorporated manufacturing, wholesale, retail and service businesses almost doubled between 1939 and 1944. In addition, independents in all retail trade fields accounted for as large a proportion of total sales in 1944 as in 1939. In other words, they held their own over this period."

Some Firms Still in "Red"

Mr. Bowles concedes in his statement that there are a few companies still operating in the red. Also, that there are other companies whose general position is profitable but which are losing money on some items.

"But when we hear about these cases," he said, "we must weigh them against the little known fact that, based on reports to the Bureau of Internal Revenue, in prewar 1936-39 nearly 60 per cent of all corporations—large and small—were in the red. The sales of companies operating at a loss in 1936-39 accounted for at least 25 per cent of the total volume of sales in that period.

"All available figures show that during the period of wartime price control, American business, even after the payment of all taxes, has been more prosperous than during any other period in our history.

"OPA pricing policies put a floor under the earnings of an industry by providing that price increases will ordinarily be made if industry-wide earnings go below the average of 1936-39."

STEEL EXPANSION

A complete report, "Steel Expansion for War," covering the expansion of iron and steelmaking facilities during the past four and one-half years, both government and privately financed, will be released by the Steel Division, War Production Board. It was prepared by W. A. Hauck of the Steel Division. A digest of the report will be published in STEEL June 18.

STEEL also will reprint the complete report, supplemented by 70 pages of photographs of representative projects included in the program. Copies of the report may be obtained at nominal cost by addressing Reader's Service Department, STEEL, 1213 West 3rd Street, Cleveland 13.

Reconversion Planning Is Going Ahead Rapidly in the Dominion

Controls being lifted to permit resumption of civilian goods manufacture on limited basis. Automobile builders authorized to turn out 10,000 passenger cars this year and are expected to operate at peak production in 1946

ARRANGEMENTS are proceeding rapidly for reconversion of Canadian industry from wartime to peacetime production.

Canadian automobile manufacturers have been authorized to produce 10,000 civilian motor cars this year and the first of these will be rolling off assembly lines next fall. Automotive plants will operate at peak production throughout 1946.

Permits have been granted to General Motors of Canada Ltd., Chrysler Corp. of Canada Ltd., and Ford Motor Car Co. of Canada Ltd. to manufacture cars this year. Some minor changes in body lines are expected. Nickel and chrome will be available to put bright finishes on bumpers, trim and other parts.

The Wartime Prices and Trade Board has announced an order to increase production of farm machinery and attachments for the coming production year. At the same time it stated that all restrictions on production of repair parts have been removed. Rationing of items in short supply will be continued to assure fair distribution. Early in May the board announced production quotas would be maintained at about 100 per cent of the 1944-45 rate. Present indications are for an output of about 130 per cent of 1944-45 production in the coming year.

Importers are free to sell under ration limitations whatever quantities of machinery and equipment their suppliers are allowed to ship to them under the terms of the United States War Production Board. The board's statement said that beginning July 1 all producers with total net sales, including exports and subsidiaries, of $500,000 per year or more in 1941 must have their production schedules approved by the administrator of farm machinery, H. H. Bloom, and may not change these schedules without approval. Producers with a net sales volume of less than $500,000 in 1941 are not required to obtain board approval of their production schedules unless requested to do so.

Neither producers nor importers may sell any machinery or equipment requiring rubber tires without the written approval of the administrator.

In the past, quotas have been split between Eastern and Western Canada, but under the new order this feature has been eliminated. Each manufacturer and importer now is required to distribute to each province in proportion to his average sales in each province during 1940, 1941 and 1942, the board said. The production quota controls imposed last year for the period ending June 30, 1945, have been canceled. Scheduling of production by large producers begins July 1.

As a further step in the swing to civilian production, the minister of munitions and supply stated regulations requiring prior approval of purchase of United States steel, copper and aluminum in mill, semi-processed and processed forms have been rescinded.

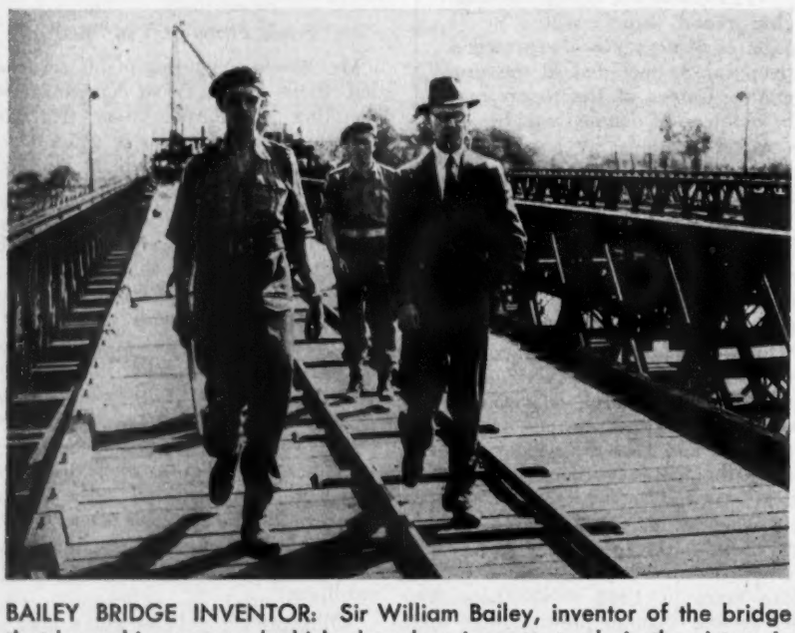
Removal of these restrictions applies to all purchases for delivery after July 1, and prior approval of such purchases by the priorities officer, steel controller or metals controller is no longer mandatory. Manufacturers reconverting to civilian production will thus be able immediately to negotiate directly with their suppliers for requirements from the United States.

Materials Not in Free Supply

This is of interest principally to those manufacturers who are dependent on materials in forms or specifications not available in Canada. The rescinding of the regulations does not mean that these materials are in free supply. Some forms of steel in particular will be difficult to obtain. Priority assistance will still be available on purchase orders for materials for military programs, and also for many civilian requirements. The United States suppliers are still required under the United States Controlled Materials Plan, to give delivery preference to orders to which such assistance has been granted.

The Department of Munitions and Supply announced that all restrictions have been lifted on the purchase and use of copper wire, copper sheet and tube, wrought copper and copper alloy products. Until now, a metals control permit has been required before copper sheet or tube could be used in the construction or repair of buildings or municipal water services. The announcement said the orders controlling copper wire bar, copper wire, rod copper and copper alloys are being replaced by one order which establishes a permit basis for sales of copper by refineries and sales of copper wire rod by the mills. Restriction on inventories of woven wire products in the pulp and paper industry also were removed. Standardization restrictions on the manufacture and distribution of wire nails have been removed. These restrictions have been in effect since Oct. 1, 1942, when they were designed to conserve steel.

Wartime Prices and Trade Board has announced that controls over production of electric stoves of all types have been revoked. The new program calls for production of 17,500 units during the remainder of this year. However lack of labor and materials is handicapping production.



BAILEY BRIDGE INVENTOR: Sir William Bailey, inventor of the bridge that bears his name and which played an important role in the victory in Europe, is shown at right inspecting a span thrown across the Rhine by British Royal Engineers. International News photo

Union Policy on Organizing of Foremen Stated

Constitution of union provides for membership of all working in plants except employes empowered to "hire and fire"

SINCE a recent ruling of the National Labor Relations Board that foremen and assistant foremen, who have been designated by management as so-called supervisory employes, are entitled "to the full protection of the National Labor Relations act," intensive activity is reported to have developed among foremen in the steel plants to organize them into various unions.

To make its position clear in the matter, the United Steelworkers of America has issued a statement of policy adopted by the International Executive Board of the union. This statement points out that the constitution of the union specifically provides that all men and women working in and around the mills, plants and mines over which the union assumes jurisdiction, except those having the power to hire and fire, shall be eligible for membership. This statement goes as follows:

"During the early organizational efforts of the union and at a time when the union was entering into initial contracts with the various large companies in the industry, the union acceded to the urgent demands of the companies that certain groups of so-called foremen and assistant foremen be excluded from the provisions of the collective bargaining units. This practice resulted in many employes being deprived of the protection of collective bargaining agreements even though they did not properly fall within the province of management, but actually were directly related to the production and maintenance workers.

Say Foremen Seek To Organize

"The National Labor Relations Board has recently ruled that foremen and assistant foremen, who have been designated by management as so-called supervisory employes, are entitled to the full protection of the National Labor Relations act. On the basis of this decision, intensive activity has developed among the foremen in the steel plants to organize into various unions.

"It must be recognized by management that the existence within a single plant of one union for production and maintenance employes and another union for the foremen and assistant foremen who are actually directly related to the production and maintenance workers, may well produce unnecessary conflict and turmoil.

"The International Executive Board of the United Steelworkers of America, therefore, adopts the following policies which shall provide the basis for the activity of this union in regard to the organization of supervisory employes:

"(1) With respect to supervisory personnel who have the right to hire and fire, it should be clear that such employes are not eligible to membership in the United Steelworkers of America and no effort shall be made by this union to organize them into the organization.

"(2) With regard to foremen and assistant foremen, gang leaders and others of this character, who are actually directly related in their work to the production and maintenance workers, the union shall endeavor to negotiate with the several employers for the purpose of arriving at a mutually satisfactory agreement pursuant to which our existing agreements covering production and maintenance workers shall be extended to include such additional employes."

Work Progressing on New Brazilian Steel Plant

Brazil's new steel mill 90 miles northwest of Rio de Janeiro is progressing toward completion.

Designed to double Brazil's steel making capacity, the enterprise, the Volta Redonda plant, is scheduled to produce annually 360,000 tons of metallurgical coke, 300,000 tons of pig iron, 250,000 tons of steel bars and 200,000 tons of steel plates and other rolled products.

Despite transport and supply delays incident to war shortages many of the basic units have been completed.

Warehouse Cancellation Date Pushed Forward

War Production Board has advanced from June 30 to June 16 the date by which steel warehouses must cancel orders placed on steel mills for sheet steel in excess of recently established third quarter quotas. Advancing the mandatory cancellation date by two weeks will enable the Steel Division to get a better picture as to the open space in mill rollings, and should enable those warehouses which have been able to place orders for their full third quarter quota to do so. Warehouses have until Aug. 1 to cancel or revalidate orders for sheet steel to be delivered from mill rollings during fourth quarter. Steel producers are directed to lift from third quarter rolling schedules any warehouse orders for sheet steel that were placed prior to May 15 if the warehouse has not revalidated by June 16.

TRANSITION TOPICS

RECONVERSION—First interim models of passenger cars unveiled. Builders optimistic on obtaining materials to produce quota for remainder of year. New Army cutbacks expected to release additional steel, manpower. See page 91.

WEST COAST—Time is approaching when decision on disposal of warborn western steel plants must be made. Geneva steel structural mill running out of orders while demands on plate mill diminish as shipbuilding program is completed. See page 94.

PRICES—Steel producers hold recent advances insufficient to compensate for wartime increases in costs. Price adjustment means actual decrease for some smaller producers. See page 96.

CANADA—Dominion's controls are being lifted to permit limited production of civilian goods. Ten thousand passenger cars may be built this year. See page 98.

CONTRACT SETTLEMENT—Many items in settlement can be agreed upon in advance through pretermination agreements. See page 100.

FOREIGN TRADE—Extension of Trade Agreements act advised by Assistant Secretary of State Clayton, as aid to developing postwar trade. See page 104.

AUTOMOTIVE—Manufacturing techniques of future to be aimed at reducing amount of machining as means of saving material, man-hours and machine time. See page 107.

SALES PROBLEMS—Vastly increased productive capacity and demands for full employment to impose heavy postwar burden on sales executives. See page 113.

AIRCRAFT—Jet propulsion and gas turbine developments seen as having great influence in both military and civilian aviation. See page 114.

Many Preterminations Agreements Arranged with War Contractors

Experience shows most items in settlement can be agreed upon in advance of termination, including profit, general and administrative expense, cost of inventory, classification of inventory to scrap and retention items

MANY preterminations agreements, such as those being negotiated with 19 steel companies, already have been arranged with war contractors by the Army and Navy, according to Col. Curtis G. Pratt, deputy director, Army Service Forces Readjustment Division. These experiences have shown that almost any item in the settlement can be agreed on before termination excepting the exact number of units of inventory on hand at termination—and that becomes a simple matter of adjustment once the basic terms have been set ahead of time.

"In these agreements," says Col. Pratt, "the government and the contractor can agree on profit, general and administrative expense, cost of inventory, classification of inventory into scrap, and on transfer-to-government and retention items.

"Several weeks ago the Allis-Chalmers Mfg. Co. signed an overall agreement involving highly diversified war production in excess of $400 million. This agreement has done much to iron out the bugs which we feared in dealing with large companies where the contract-by-contract approach is impracticable. In the steel industry the way has been paved by the American Rolling Mill Co. which has submitted a formal proposal since approved covering all of the company's war contracts. We hope that similar arrangements will be set up with the other steel companies.

Ready To Help Contractor

"We also have instances where the contractor may want to enter a partial pretermination agreement—and we are ready and willing to accommodate him. Some contractors, for example, want to make an advance arrangement covering removal of inventory they will not wish to retain. Preterminations agreements may cover all the contracts of a company, including both prime and subs. Agreements may be of the 'open-end' type, providing for settlement of contracts the contractor may book in the future. They may include provisions for interim financing of whatever type may be required and assure the contractor against bankruptcy. Each agreement may be 'tailored' to fit the particular set of problems it is aimed to cover."

There are various ways, according to Colonel Pratt, to set up an arrangement under which the contractor can agree today as to what his inventory will be worth six months from now. "It may be that the contractor would want to use some trade indexes in effect at the time of termination. He may want to work out a percentage formula. He may want to base his retention price on market values of the items at time of termination. Any of these plans, or others, may be used.

"We also have found a very satisfactory formula for cases where a contractor after termination stands to make an excessive profit out of retained inventory; this consists of incorporating in the agreement a 'recapture clause' whereby all returns on sales over and above a certain price will revert to the government. Similarly, a clause may be included to offset gains against losses within adequate limits.

Unusual Situations Dealt With

"We have been able to work out agreements covering unusual situations as where a subcontractor makes a common item for a number of primes. While it is basically the duty of the prime to make pretermination agreements with his subs, the government may step in in such cases and negotiate an agreement covering all contracts of a sub. Thus the sub is relieved of the necessity for dealing with different sets of government agents.

"The agreement," says Colonel Pratt, "should provide that either party, in the event of the development of an inequity, or in case the facts surrounding any particular element change, may request further negotiation. Or, it should permit either party to withdraw from the whole agreement with respect to future terminations, although not with respect to terminations which occurred prior to issuance of the notice of withdrawal.

"The big reason for pretermination planning is the saving of time following termination. We have ample proof that these agreements do save time. For example, a pretermination agreement enabled the Ford Motor Co. to change from one item of war work to another in 28 days. The company disposed of its inventory and cleared its plant in that time. Without termination planning it would have taken much longer. All the difficult questions had been answered in advance and the company knew exactly how to proceed. This termination was a big one, involving some $139 million.

"Any contractor desiring to enter into a pretermination agreement should contact his local contracting officer. In the event he is doing business with two or more services he should contact the contracting officer with whom he has the majority of his business. These officers are thoroughly informed and are in a position to give the contractor quick action."

GUY M. GILLETTE

Changes in the surplus property disposal act will be asked by the Surplus Property Board, according to Guy M. Gillette, whose resignation as chairman of the board has been submitted to the President. While the changes to be asked were not detailed by Mr. Gillette or board members, they are understood to include a single administrator for war surpluses in place of the present three-member board, and the granting of more independence to the administration of surplus disposals. NEA photo

One of the interesting features of pretermination planning procedure, as indicated by the alternative costing methods which may be stipulated by the steel companies (STEEL, June 4, p. 85) is that the contracting officers do not arbitrarily accept OPA ceiling prices as representing cost plus a reasonable profit. Lieut. Col. C. M. Gilmour, chief, Pretermination Branch, Army Service Forces Readjustment Division, gives the official view on this point as follows:

"If a company requests that the established OPA ceiling price be used as the basis for costing its claims, and if the company can substantiate that the use of the OPA price will represent cost plus a reasonable profit, then the pretermination agreement would provide that steel claims be costed on this basis.

"In addition, we recognize that fair compensation to the steel companies is largely connected with and linked to retention values, and when the steel company agrees to retain inventory the fair compensation which the government would agree to recognize as fair and reasonable to the extent allocable to the terminated portion of a prime war contract would be the difference, or spread between the established OPA ceiling price and the agreed retention value.

"It is hoped," adds Colonel Gilmour "that the steel companies will agree to

What's going to happen to the SUZY Q?

Remember the graveyard of rusting ships after the last war? For years a grim reminder of surplus war production, they also represented a practically bankrupt shipbuilding industry.

Today, America's aircraft industry accounts for a substantial proportion of our total national economy. That industry has produced more than a quarter of a million planes since Pearl Harbor! Its plants, equipment and production represent 50 billion dollars worth of taxpayers' money.

Here is the most valuable single peacetime legacy of war. . . . Here is power to maintain peace, insure our national security and provide jobs for millions of Americans . . . And here is a critical problem.

For the percentage of profit earned by our aircraft industry is so low that its entire capital reserves amount to only a few days' operating costs! The lack of a sound national airpower policy could actually result in the collapse of a great industry and the promise it holds for the whole world.

We at Bryant know that we can sell many machine tools to a healthy peacetime aircraft industry. But far more important — those tools mean jobs, and our last chance to enforce peace throughout the world.

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

retain a large portion of their war inventories."

One method by which the contractor may demonstrate that the price he asks on steel represents cost plus a reasonable profit is to furnish substantiating information to the pretermination team, says Colonel Gilmour. Another is to furnish to the team copies of the reports which the contractor has given to the OPA. A third method is to give the pretermination team access to all information in the OPA files. A fourth method is for the government to get an OPA certificate stating that the established OPA ceiling price represents cost plus a reasonable profit for the particular contractor.

"With the use of one of these four methods," says Colonel Gilmour, "the company can demonstrate that an established ceiling price represents cost plus a reasonable profit. If the company elects to use one of these methods, then the pretermination agreement would so provide, with due provision for certain appropriate adjustments to cover such items, for example, as freight included in the price but not actually paid out."

In cases where steel companies have complained that the OPA ceiling prices on steel products have been unduly low, says Colonel Gilmour, the companies may use the first method mentioned above. "The only test," he says, "is whether the product groupings covered by the pretermination agreements in the aggregate represent cost plus a reasonable profit. Some individual product groupings covered by an agreement might conceivably represent a loss, others a profit, but if the aggregate of the product groupings covered by the agreement clearly demonstrates that such ceiling prices would reflect only cost plus a reasonable profit, then that is the test."

OPA Ceiling Prices Used

For example, the pretermination proposal of the American Rolling Mill Co. cited OPA ceiling prices as representing cost plus a reasonable profit and then subtracted from the ceiling prices the agreed retention values of the steel in inventory. The proposal also provided for recapture of any excessive profits which the company may realize from values over and above the agreed retention values. Such a recapture clause will not necessarily be incorporated in all of the agreements with steel companies, says Colonel Gilmour; this will depend on the particular circumstances in each case.

For the benefit of contractors who may be confused as to what factors properly may be considered in setting up a pretermination agreement, Colonel Gilmour says:

"Actually, the very simplest way to express the program is to visualize, first, a list of anticipated termination inventory; that is, simply a list of the different items taken from the bill of materials which the contractor would have on hand if he were to be terminated today.

"With that list of termination inventory available, six different factors can be agreed to. On the one hand are the property features and of these there are three elements: 1—Scrap; 2—transfers to the government; and 3—the retentions. All that this means is that the contractor and the contracting officer go down these lists of items and split them up into three groups—first the retentions, second the items that will be taken in by the government (such as completed components for use as spare parts), and third the items to be retained by the contractor as scrap. This scrap will generally consist of all work-in-process on which machining has not been completed, and which will not be completed unless on the date of termination there is a military requirement for such items.

"On the other side of the ledger are the accounting or finance features consisting of three elements: 1—The profit; 2—general and administrative expense and 3—the costing of these individual items on the termination inventory list. Thus, if a contractor agrees on the profit, the general and administrative expense, and the cost of the inventory, and agrees which items are to be retained by him and which are to be transferred to the government, and which items are to be scrapped, the amount of fair compensation to which he is entitled becomes simply a matter of arithmetic.

"Insofar as plant clearance is concerned, he can go out on the floor of his plant, shove scrap items in the cupola, retention items in the bin, and ship transfer items directly to the government, in accordance with the terms of the agreement.

"One other point that might be made clearer is that these pretermination agreements on these six elements are not absolutely fixed; an appropriate provision must be made for their adjustment so that the agreement may be kept on a day-to-day basis in accordance with the facts. Costing of inventory, for example, may be adjusted in accordance with an formula. Likewise, the property classifications and retentions, transfers and scrap are generally covered by a special clause in the contract which will permit the government on or prior to the effective date of termination to switch an item from scrap into the transfer classification if it is apparent on the date of termination that there is a military need for that particular item."

DISCUSS VETERANS' PROBLEMS: Bring. Gen. Frank T. Hines, administrator of veterans' affairs, discusses the problems of the disabled servicemen with two veterans of World War II. At left is Irving Peltz, Brooklyn, N. Y., who lost an arm, a leg and an eye while serving with the field artillery in Italy, and at right is Marine Sgt. Maurice Pion, Dale, Conn., who lost an arm on Guadalcanal. NEA photo

Small Business Men Flood House Group With Letters

V-E Day has been followed by the heaviest flood of letters from small business men in the history of the House Small Business Committee. "In apparent anticipation that both military and civilian agencies can now more easily estimate the requirements and length of the Japanese war, these smaller business men are asking the Congress to give greater heed to the special problems they believe to be primarily the lot of small business," says the report of the committee.

"Summed up, these letters indicate that small business fears the following:

"1—That cutbacks in military procurements will not be offset by direct channeling of an equitable share of available

materials to small manufacturers in an amount or in a manner that will enable these small firms to effect a changeover from war to civilian production while their cash reserves hold out. This fear expressed despite the special treatments for small firms announced in recent WPB and OPA reconversion programs.

"2—That, in the disposition of government-owned surpluses, small firms of all types will not be given adequate consideration.

"3—That alleged inequities in our present tax and renegotiation laws which affect small business will not be corrected soon.

"4—That proposed programs, both public and private, for opening up sources of long-term capital and venture capital for smaller firms are mostly 'lip service' and will never become effective in time to meet the needs of small firms in these fields in the months to come.

"5—That the postwar competition of large distribution outlets such as manufacturer-owned retail stores, chains, and mail-order houses will increase and make it definitely hazardous for many small, locally-owned, retail firms to engage in or stay in business."

Farm Machinery Production Must Increase 30 Per Cent

Production of farm machinery and equipment in the coming crop year must be increased 30 per cent above the levels scheduled for the year ending July 30, 1945, War Production Board officials have informed the industry. The problems of obtaining additional manpower and materials and components in quantities sufficient to meet the proposed schedules will be difficult.

However, officials explained that an increase in the industry's carbon steel allotments is expected in the third quarter. The industry has been advised that orders should be placed immediately and validated in the amount possible when the third-quarter allotments are made. Delivery of the remainder of the orders may be made by mills or suppliers on a competitive basis after rated orders have been filled.

At present, only tractor production is about on schedule, while other items of farm machinery and equipment are anywhere from 7 to 28 per cent behind schedule.

Surplus Property Disposals Rise to New High in April

Surplus property disposals, reported by the Surplus Property Board, in April totaled $44,212,000 on the basis of cost of the property, the highest reported to date, for which the sales price was $15,733,000. During the same month, $133,050,000 worth of property was declared surplus, increasing inventory at the end of the month to $1,488,121,000.

New Regulations Provide for Company-Wide Settlements and Protect Subcontractors

TO SPEED and improve contract settlement, Robert H. Hinckley, director of contract settlement, has announced two new regulations dealing with company-wide settlement and providing for methods of protecting payments to subcontractors in cases where the higher tier contractor is insolvent. Under the company-wide settlement plan one contracting service, bureau, or operating unit will be assigned to settle directly with the company all of the company's claims, even though they arise under contracts of many procurement offices. Both regulations apply only to claims for fair compensation for termination and do not apply to claims for goods delivered prior to termination.

Regulation 16 deals with company-wide settlements. Mr. Hinckley explains: "This office is convinced that a program of company-wide settlement applied to a limited number of cases will be of great value for speeding payments to companies coming under the program and the large number of subcontractors who deal with them. Application of this procedure will minimize duplication of effort in processing claims, excessive paper work, lack of uniform treatment from various customers, and slow payment of claims."

Regulation 17 provides for the protection of termination claims of subcontractors against insolvency of higher tier contractors. It permits subcontractors to make application to contracting agencies for direct payment or settlement of their claims in cases where their customers are, or are in danger of becoming, insolvent.

Committee To Make Selection

A committee of three, consisting of representatives from the War and Navy Departments and Office of Contract Settlement, will select companies for company-wide settlement upon application of the company through a contracting agency. Generally speaking, the companies selected will be those which have a large number of subcontracts with many different customers, and which have demonstrated an ability to handle the claims of their subcontractors expeditiously. Settlements will cover both prime contracts and subcontracts of the companies selected.

For the present it is expected that only the War and Navy Departments will be organized to conduct settlement on a company-wide basis.

The assigned contracting agency will ordinarily put a settlement team in the contractor's plant, including the necessary negotiating, legal, accounting, and property disposal personnel. Qualified personnel available for this purpose is limited. Therefore one of the criteria for the selection of companies for the program is that the volume of their war business and termination claims is large enough so that this method of settlement will result in an economical use of government personnel. The number of companies which will be brought under the program will therefore not be large, but the total volume of their own and their subcontractors' claims will be so substantial that the whole settlement process will be expedited by this procedure.

Regulations 16 and 17 both provide that subcontract settlements may be made directly by the government without taking into consideration offsets held by the government against higher tier contractors, or offsets between higher tier contractors. Likewise, these direct settlements need not take into account insolvency of higher tier contractors or assignments made by them.

Where equity and good conscience require, regulation 17 permits contracting agencies to pay fair compensation for termination to subcontractors even though compensation on account of the subcontractor's claim has already been paid to a higher tier contractor.

The War and Navy Departments are amending their joint termination regulation to incorporate the new Office of Contract Settlement regulations Nos. 16 and 17.

Stockpiling of Strategic Raw Materials Is Urged

Importation and stockpiling of strategic raw materials as a future defense measure and aid in balancing the nation's foreign trade was urged by William L. Batt, vice chairman, War Production Board, at a meeting of the National Council of American Importers in New York recently.

He estimated that American exports in the immediate postwar years would total around $10 billion annually and imports between $6 billion and $7 billion. This future trade account, he said, should be balanced through the stockpiling of all materials.

Because of the drain of two world wars, the United States should find it advisable to import even such raw materials as high grade iron ore, zinc and copper, to say nothing of certain other materials for which this country has always had to rely principally on outside sources. Such importations, he said, should be placed in reserve.

Mr. Batt said that while the United States is constantly tightening up on lend-lease, there is no present adequate means of financing the requirements of many countries for urgent rehabilitation purposes.

State Department Seeks Power To Raise or Lower Rates of Tariff

Assistant Secretary of State Clayton, advocating extension of Trade Agreements act, tells Senate group that provision for additional bargaining power in fixing import duties is necessary to develop postwar trade

THERE are only two roads open to us in shaping our economic policies in the postwar world, William L. Clayton, assistant secretary of state, told the Senate Finance Committee in advocating extension of the Trade Agreements act, with a provision for additional bargaining power in fixing import duties.

"We can follow the path of economic liberalism, or we can take the road to economic nationalism leading inevitably to regimentation, to state trading, to international irritations and retaliations and, in the end, to the creation of an atmosphere in which the seeds of conflict are sown," declared Mr. Clayton.

"I do not believe it is an overstatement to say that most of the other nations of the world will take the same road we take; but they will only take the road to economic liberalism if we give prompt and vigorous leadership.

"We all recognize that a gigantic job of reconstruction and development is to be done in the world, and that the United States is the principal source of supply of the enormous volume of machinery, tools, equipment, and technical know-how required to do this job. Surely, no one can deny that it is in our own enlightened self-interest to help the world get back on its feet."

The world desperately needs the goods we have for sale and the problem is one of finding dollars with which to make payment, said Mr. Clayton. Our foreign customers at first will have to restore their own productive facilities —a process which will take several years. During that period we will have to invest some billions of dollars abroad.

"For the debtor countries to pay the interest and dividends and continue to buy our goods, it is absolutely necessary that trade discriminations be eliminated and that excessive barriers to the international movement of goods be substantially lowered. This the trade agreements program is doing and should continue to do."

Tariff rates in the Smoot-Hawley bill, went on Mr. Clayton, were exorbitant, many running over 100 per cent, and not enough progress has been made in reducing them.

"At the time the Trade Agreements act went into effect 11 years ago, the average rate of duty on our dutiable imports under the Smoot-Hawley bill was about 50 per cent. This average rate has been brought down to about 35 per cent; in the meantime corresponding concessions have been obtained on imports and no American industry can show it has been seriously injured in the process," said Mr. Clayton.

In seeking the additional power to raise or lower current rates of tariff, Mr. Clayton pointed out that we already have made reductions on about 90 per cent of our total dutiable imports from our two best customers, the United Kingdom and Canada; in respect of the other western European and the principal Latin-American countries we have also used up a major part of our bargaining power. It is highly desirable that new trade agreements be negotiated with these countries, since the pattern of postwar trade necessarily will differ in many important respects from that of the prewar period. "To accomplish this purpose," he said "we need something with which to negotiate.

"This bill," he added, "is merely an enabling act, and it will be as carefully and deliberately administered in the future as in the past."

In answer to a question by Senator Bailey, Mr. Clayton thought Russia was unlikely to become a competitor in the world markets. "Her necessities at home are so enormous that it will be a long time in my opinion before Russia will be a great competitor of our country, or of Britain and other industrial countries in the world market."

Answering a question by Senator Johnson, Mr. Clayton insisted that the State Department has not and does not advocate free trade. He explained the department's practice in setting import quotas where manufacturers are worried about the threat of foreign competition.

During the hearing Senator Walsh said that he had heard from an official that Russia plans to expand her steel production to at least 60 million tons a year. Mr. Clayton said he did not know about any such plan but that "we are convinced that Russia will expand very greatly after this war."

Russia Expects To Build 25 Million Dwelling Units

A postwar home building program for Russia, calling for construction of 25 million dwelling units in the next decade, was outlined by Soviet architects and engineers at a recent meeting in the Engineers building, New York city.

Pre-fabrication and mass production may be used at the start for simple houses on a scale beyond that employed thus far in America.

Architects and engineers from both countries participated in panel discussions on pre-fabrication, building and architectural organization, and industrial building design.

POSTWAR SECURITIES

If we are to have a gross national business of some $160 billion a year after the war, postwar securities flotations would be in the neighborhood of $16 billion a year, Ferdinand Eberstadt, formerly vice chairman, War Production Board, and at present senior partner of F. Eberstadt & Co., private investment bankers, New York, told the House Special Committee on Postwar Economic Policy and Planning recently.

The present complicated structure and administration of the Federal Securities acts and regulations, he said, are a serious obstacle to such a free flow of private investment capital.

Mr. Eberstadt told the committee it has an opportunity to do a constructive job of reviewing the entire field of securities legislation with the aim of making it simpler and more workable. He raised the question whether, instead of having concurrent jurisdiction, the SEC and the various state "Blue Sky" authorities might not divide the field, with state commissions retaining jurisdiction on issues up to $1 million, for instance, and the SEC on larger issues.

Military Requirements for Communications Wire Drop

Armed service requirements for communications wire have been cut back from 313,500 miles monthly to 218,000 miles, War Production Board officials told members of the copper wire and cable industry recently. Field wire needs have dropped from 211,000 miles monthly to 156,000 miles; assault wire from 83,000 miles to 52,000 and long range wire from 19,500 to 10,000.

Truck Trailer Output in First Quarter Totals 46,568

Production of civilian and military truck trailers during the first quarter of 1945 totaled 46,568, the War Production Board reported recently. Of this total 39,305 were military and 7263 were civilian units.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

The following orders have been revoked by WPB:

ENAMELED WARE: Order L-30-b which restricted production of enameled ware. (L-30-b)

ALUMINUM COOKING UTENSILS: Order L-30-e which controlled production of aluminum cooking utensils, kitchenware and household articles. (L-30-e)

GENERAL INDUSTRIAL EQUIPMENT: Order L-123 which covered production and distribution of the following items of general industrial equipment: Air filters; air washers; arc welding machines; baling presses; compressors; ceramic machinery and equipment; concrete products machinery; dust collectors; electric type dynamometers and rotory converters; fractional horsepower electric motors and generators; fans, blowers and exhausters; flexible metallic hose, tubing and fittings; heat exchangers; high pressure blowers; lifting magnets; oil filtering and re-refining machines; industrial ovens (drying, curing and finish-baking types); paper shredders; pressure vessels, including air receivers; pumps; stationary steam engines; wire working machinery; insulation blowing machines; electroplating and anodizing equipment; oxyacetylene apparatus; and portable conveyors. (L-123)

SAW BLADES: Order L-326 and its three schedules which restricted manufacture of power-driven saw blades, other than metal cutting blades. (L-326)

ZINC DUST: Order M-11-L which controlled distribution of zinc dust. (M-11-L)

BERYLLIUM: Order M-160 which established allocation control of certain types of beryllium metal. (M-160)

AMENDMENTS

The following orders and regulations have been amended:

CONTROLLED MATERIALS: WPB has amended CMP regulation 1 and CMP regulation 4 to permit any person to place unrated orders now for immediate delivery of brass mill products. Unrated orders for other controlled materials may be placed now for delivery beginning July 1.

Following directions to CMP regulation 1 have been revoked: No. 58 which required a brass mill to give notice to WPB, at least five days before scheduling for production any order identified by the symbol "Z-1," of its intent to schedule such an order; No. 60 and No. 65 which required similar prompt action by copper wire mills and aluminum producers, respectively. Surplus property disposals to federal agencies, state and local governments have been given preference by direction 4 to CMP regulation 5A. A special MRO (maintenance, repair and operating supplies and minor capital additions) rating of AA-2X permits purchases from surplus for MRO use, in addition to MRO quotas. Uprating of orders for surplus property is also permissible. If entitled to use a rating of AA-5 under CMP regulation 5A to obtain a certain quantity of surplus property, any government agency can use a rating of AA-2X and disregard quota restrictions.

Restrictions on use of steel, copper and electrical materials in construction work specifically authorized by WPB subject to schedule A to CMP regulation 6 have been eliminated. Restrictions on use of tin, lead, zinc and lumber have been retained in the regulation with only slight changes. With the exception of oil-fired equipment and natural gas-fired equipment, any equipment that can be obtained without a rating may now be installed under the project authorization. In general the rating may not be used to get equipment that is not listed and approved. (CMP Nos. 1, 4, 5A, 6)

ANTIFRICTION BEARINGS: Requirement that producers of antifriction bearings fill rated orders only has been removed by amendment of order E-10. Unrated orders may be accepted and filled by producers of antifriction bearings, provided they are able to meet the delivery dates on their rated orders as required by Priorities Regulation 1. No user can accept delivery of any antifriction bearing of any type and size if his inventory of such type and size is, or will be by virtue of acceptance, greater than the quantity of the item he will use in the succeeding 60 days. An exception is made in the case of persons starting or resuming civilian production, who may receive the minimum amount of antifriction bearings needed during the first 30 days of such production, provided no priorities assistance is used to get the bearings.

Purchasers of antifriction bearings who are applying or extending preference ratings on their orders must furnish a statement of the product into which the bearings are to be incorporated by the purchaser. If the bearings are not to be incorporated into a product being produced by the purchaser, he must state the fact. (E-10)

MECHANICAL REFRIGERATORS: Production of domestic mechanical refrigerators may be resumed in the third quarter of 1945, subject to assignment of specific production authorization to manufacturers by WPB. Manufacturers apply for permission to enter production by filing form WPB-3700 with the local WPB field office. Manufacturers in group 1 and 2 labor classification areas who employ more than 100 workers must obtain approval on form WPB-3820 for the use of labor for refrigerator production. An AA-3 preference rating will be assigned to materials for production under the program. Production of parts for use in servicing or repairing refrigerators is not restricted by the order. (L-5-c)

DOMESTIC COOKING APPLIANCES, HEATING STOVES: Production restrictions on accessories and bright work for nonelectric domestic cooking and heating stoves have been removed. Accessories include aprons, high closets, high shelves, clocks, lights, timers, broilers not using oven burners (except for combination ranges), broiler pans other than iron, steel or aluminum, and cover-alls. (L-23-c)

CONSTRUCTION: Order L-41 has been amended by raising the annual dollar value limits on various types of construction that may be undertaken without WPB authorization and by expanding other exemptions from the provisions of the order. These exemptions permit certain types of construction jobs without WPB authorization and without regard to the annual cost limits. (L-41)

PLUMBING FIXTURES: Restriction on the use of metal in the manufacture of plumbing fixtures have been removed by revocation of schedule XII of the plumbing and heating simplification order. (L-42)

HAND TOOLS: The following five schedules, which limited production to the kinds, sizes, types, and models of hand tools specified and which imposed certain restrictions on the use of critical materials, have been revoked: No. I which covered hand shovels, spades, scoops, telegraph spoons and snow shovels; No. II which covered forged axes, hatchets, broad axes, adzes and light hammers; No. IV which covered heavy forged hand tools; No. V which covered forks, hooks, rakes, hoes, eye hoes and hand cultivators; and No. VII which covered wheelbarrows.

Only schedule VIII, covering various types of wood-boring bits, remains in effect. Schedule III, which covered manually operated wood and special saws, was revoked in May and no schedule VI was ever issued. (L-157)

AUTOMOTIVE MAINTENANCE EQUIPMENT: Under order L-270, as amended, restrictions on production of individual items of automotive maintenance equipment, except to fill military orders, include: No production of schedule A items; no producer shall manufacture in any calendar quarter more of any item listed in schedule B than 50 per cent of the number produced by him in the corresponding 1941 period; no producer shall manufacture in any quarter any item listed in schedule C in excess of 100 per cent of the number produced by him in the like 1941 period; no producer shall manufacture in any quarter a dollar volume of repair parts greater than 10 per cent of the total dollar volume of like items made by him in the like 1941 period. Schedules of items covered have been extensively revised. (L-270)

METAL INSECT SCREENING: Order L-303, as amended, defines "essential civilian users" and describes the procedures to be followed by these users and by distributors in applying for priorities assistance. It makes clear that blanket MRO ratings may not be applied to get screening. Manufacture of 18 by 14 mesh is now permitted. (L-303)

MOTORCYCLES: Restrictions on production of motorcycles have been lifted. Distribution controls, however, are retained in the amended order. (L-331)

ZINC: An additional 20 per cent of amount of zinc used in fourth quarter of 1944 may be used for applying a protective coating or plating, other than paint, to products not on list A (the prohibited list of order M-11-b) or list B (the permissive list). The order previously allowed zinc for protective coatings (other than paint) up to 100 per cent of the amount used in the fourth quarter of 1944. (M-11-b)

TIN: Corresponding calendar quarter of 1944 has been established as the base period for use of pig tin in all schedules of M-43. Previously the corresponding 1940 quarter was the base period. Quotas are now computed on the basis of the use of pig tin only, rather than upon the total tin consumed (pig tin plus secondary tin in alloys). The new quotas, on the basis of total tin used in the 1940 base period are: Solder and babbitt, each 40 per cent; foil, 25 per cent; dairyware, 150 per cent. Bronzes, tin plate and terne plate are controlled by other orders. Generally, no person will be allocated more pig tin for the present or future calendar quarters of 1945 than was received during the corresponding quarter of 1944. There are no extra quotas for military or export requirements. (M-43)

SCHEDULED PRODUCTS: Table XI, covering shipbuilding components, in order M-293 has been amended as follows: Marine boilers for shipboard use, both with main propulsion and auxiliary units, are removed from the table; procurement of all commercial diesel engines is removed from the "Y" procedure, which requires purchasers to obtain WPB approval before placing orders, and manufacturers to obtain similar approval before accepting them; commercial operators must file applications for priority ratings on form WPB-541; and requirement for operational report on the production of speed reduction units is eliminated. (M-293)

METAL STRAPPING: Order P-152, assigning preference ratings to be used in connection with deliveries of metal strapping, seals, strapping tools, accessories and fittings has been amended to permit Canadian shippers to use ratings assigned by the Canadian government to get strapping in the United States. Disc binders have been added as one of the fittings to which the order refers. (P-152)

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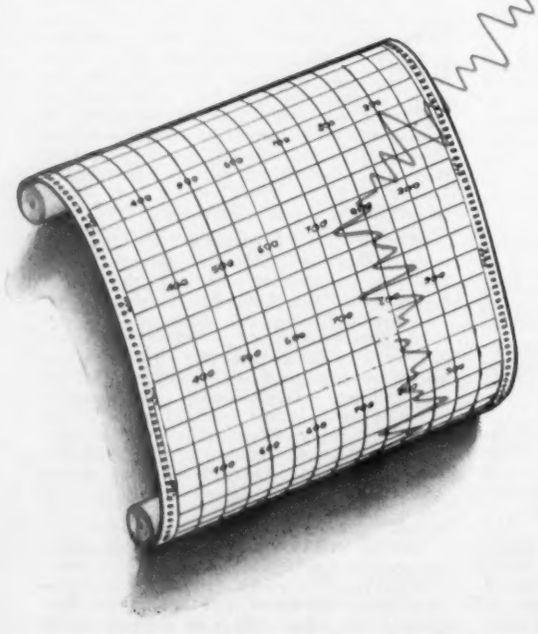
FOR A NERVE-TWITCH



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By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Automotive industry turning away from expensive machining operations, attempting to find quicker ways to make parts and save scrap loss, man-hours and machine time. "Precision" castings and weldments alternative methods

TAKING a long-range squint at trends in automotive manufacturing techniques and the thinking bearing thereon, one is impressed not so much by contemplated changes in the basic raw materials, as far as metals are concerned, but rather by revisions being talked in processing and manufacturing methods. They are aimed principally toward cutting down the man-hours of labor involved in such operations as forging and machining, reducing the amount of metal which must be removed from semifinished parts and tossed into the scrap bin, and thereby slashing the net cost of fabricated parts.

The industry has learned much from its wartime manufacturing programs, but perhaps it has learned more of what not to do than of what is better than previous peacetime methods. An example is the case of steel aircraft engine parts which must be laboriously turned, milled, drilled, ground and otherwise whittled down from an alloy forging until, in some cases, only one-third of the original metal remains. That is definitely not the way to process automotive parts if they are to be made to a price.

So the industry is turning away from expensive machining operations and trying to find other, quicker ways to make an equivalent part which will save scrap and, more importantly, save man-hours and machine time. One method is the replacement of forged and machined parts by stampings and welded assemblies thereof, which the automotive industry has been doing for many years and will continue to develop, probably on a wider basis. Even during the war, in ordnance products, such as machine guns, stampings have demonstrated they could take it in parts which ordnance experts had always insisted whittling down from heavy forgings or bar stock.

Second Technique More Recent

A second technique is more recent, involving the production of "precision" castings, then shotblasting them and following this up by hot or cold coining the part in a press. By precision casting is not meant necessarily the lost wax investment casting process, but rather certain outgrowths of this idea which have been devised for production parts. Both Ford Motor Co. and the Saginaw Malleable Division of General Motors have been experimenting in this direction with considerable success. Saginaw Malleable is understood to have produced some connecting rods of its pearlitic malleable iron, which is called armasteel to convey the idea of greater strength, and followed the casting by heat treating, shot blasting and coining. Resultant finish is so good that no machining is necessary except on bearing surfaces. This is only one isolated example of what may be possible.

German technical experts have made good strides in the combination of casting with hot pressing, not only on iron but on the light metals as well. Up to the present, not much has been made in this country along this line, but interesting developments are just around the corner.

Ford reportedly is running tests on an experimental engine in which every single component is a casting—block, head, crankcase, crankshaft, camshaft, connecting rods, pistons, tappets, valves, etc. The Rouge metallurgical staff always has been particularly partial to castings and there seems no reversal in prospect on the score. A recent development which metallurgists are talking about is a cast aluminum piston which is pressed to final size and requires only a light pass in a centerless grinder to finish for installation.

It is interesting to speculate on what these trends may mean in the way of equipment. In the first place, they seem to portend more and more presses, upsetters, welding equipment and grinders, while at the same time pointing to a reduction in the number of machine tools and forge hammers required by automotive shops. Already the industry is grumbling about the difficulty of obtaining presses, which may be an indication of its production planning. There is no great lack of the larger stamping presses such as used for tops, doors and side panels, but in the intermediate sizes and in the smaller size fast-action punch presses, a marked increase in numbers is in prospect.

On the score of forging hammers, the industry learned before the war that on many jobs presses and upsetters can back the old board and steam drop hammers into the shade, both as far as quality of production and quantity of output are concerned. Presses also are cleaner to operate, less noisy and capable of being operated by less skilled help.

All present indications point to a decided reduction in the amount of machining necessary in the production of an automobile and its components. It is felt that here lies the greatest opportunity to work out cost savings by virtue of reduced man-hours of labor, so any idea looking toward the elimination of machining operations is being studied carefully.

W. J. SCOTT

Mr. Scott has been appointed assistant general manufacturing manager of the Chevrolet Motor Division, Detroit. A veteran of 30 years' continuous service with Chevrolet, he has been manager of the division's gear, axle and forge plants in Detroit since 1939 and also, since 1942, in charge of war production at Chevrolet's aluminum forge plants in Muncie, Ind., and Saginaw, Mich

Aircraft Cancellations Announced

Cancellations of around $26,400,000 at the Outer Drive plant of Briggs Mfg. Co. in contracts for gun turret assemblies and related spare parts for the Consolidated B-32 Dominator bomber have been announced. These Briggs-built parts are classified as government-furnished-equipment (G.F.E.) and are scheduled 60 days ahead of final assembly, and when production of an airplane is stopped, as in the case of the B-32, there is an immediate surplus of this G.F.E. equipment. Under law, production must be stopped at once. The cutback will displace about 1600 at the Briggs plant which was built solely for bomber turret production, and other Briggs feeder plants. All reductions in personnel are being made according to seniority provisions.

Meanwhile other scattered cutbacks have been announced, but according to the grapevine nothing compared to what will be coming out of military procurement agencies in the next few weeks. Production of M-4 medium Sherman tanks will be terminated shortly at the Chrysler arsenal, releasing upward of 3500 employes. Output of the M-26 heavy Pershing will continue, as at the Fisher tank arsenal in Grand Blanc where presumably the assembly of M-4 likewise has been stopped. Chrysler also will return management of the Anniston, Ala., Ordnance Depot to the Ordnance Department on Aug. 30, after operating it for two years, during which time more than 1,230,000 tons of materials and equipment have been handled, and more than 448,000 line items have been shipped, in addition

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to the overhaul of hundreds of tanks, scout cars, armored vehicles and artillery. The depot covers 24 square miles, with 150 buildings and 702 underground ammunition storage igloos. Normal employment has been 5000.

Ternstedt Manufacturing Division of General Motors, virtually the sole supplier of body hardware for GM passenger cars and wartime producer of aircraft instruments, has been notified of a $3,567,000 cutback in contracts for gyro horizon and directional gyro indicators. Layoff of 1364 over next two months is indicated. This should permit immediate action in resuming production of hardware for bodies. Outlook now is for a start early next month, and it is understood the division has ample supplies of plating materials in stock or available for initial plating requirements.

Commenting on the textile outlook for passenger cars, D. U. Bathrick of Pontiac, states the average prewar car used approximately 56 yards, and while woven plastics may prove a suitable substitute for upholstery, this is a minor portion of the textiles going into an automobile. For example, he estimates 1000 cars require 4736 yards of broadcloth or 3748 yards of mohair, 3560 yards of head lining, 2316 yards of carpeting, 4761 yards of cotton sheeting, and 16,679 yards of burlap.

More manpower to operate idle looms in Eastern and Southern textile industries appears the most obvious answer to remedying shortages of these materials now regarded as critical.

1946 Bus Production Discussed

Plans for production of 16,000 integral buses in 1946 were discussed at a recent meeting of the WPB industry advisory committee in this field. Members were informed the list of simplified requirements for victory model buses had been withdrawn, but were warned that the materials outlook is still such as to preclude the inclusion of many extras in vehicles currently being manufactured. Meanwhile it is learned the General Motors Truck & Coach Division is pushing plans for construction of a large new bus manufacturing and assembly plant in Pontiac, hoping to have it in production by the end of the year although ground has not been broken as yet. Numerous innovations are included, among which is what is reported as the first moving assembly line ever installed solely for bus or motor coach construction.

Production of civilian and military truck trailers during the first quarter totaled 46,568, including full and semi-trailers, conventional or frameless chassis for such units, and pole, logging and pipe trailers. Excluded are "suspensions" for frameless trailer units. Ratio of military to civilian units is about 5 to 1.

As was expected, Packard Motor Co. is seeking court review of the decision of the NLRB certifying the Foremen's Association of America as bargaining agent for general foremen, foremen, assistant foremen and special assignment men in Packard plants. This was done by refusing to meet with representatives of the FAA, a formality which now permits judicial review of the case. In an election held some weeks ago, the FAA squeaked through to a narrow victory among Packard foremen. Concurrently, General Motors has taken a strong stand against organization of foremen in its plants, but until the decision of the courts is heard on the Packard case, the FAA probably will mark time.

C. B. THOMAS

Mr. Thomas, president of Chrysler Export Corp., Detroit, has been appointed a member of Maj. Gen. J. S. Hatcher's committee which will go to Europe soon to study the automotive situation there. Mr. Thomas will combine this trip with an inspection of Chrysler properties in Antwerp, Belgium, and London. The Antwerp plant was destroyed by the retreating Germans and the London plant was hit by a V-2 bomb just before the end of the war. General Hatcher's committee was appointed by Gen. Brehon Somervell to go to the European and Mediterranean theaters "for the purpose of reappraising the automotive situation in those theaters" to make recommendations as to the disposition of general purpose automotive vehicles.

Baldwin Locomotive Works Forms Canadian Subsidiary

Baldwin Locomotive Works, Eddystone, Pa., has formed a Canadian subsidiary to market in Canada such Baldwin products as turbines, water wheels, hydraulic presses, power tools, and diesel engines from headquarters to be opened soon in Toronto.

The wholly-owned subsidiary, known as Baldwin Locomotive Works of Canada Ltd., will subcontract its orders to the United Steel Co. Ltd., Toronto. All production will be under general supervision of Baldwin of Canada and will be from Baldwin designs and specifications.

Officers of the new company are Ralph Kelly, president; W. Horace Holcomb, vice president; W. N. Brownlie, managing director; H. D. Humphreys, secretary and treasurer; and T. E. McFalls, assistant secretary and assistant treasurer. All except Mr. Brownlie are officers of the parent company. Mr. Brownlie will direct the subsidiary and will be located in Toronto. He was chief engineer of the Mutual Boiler Insurance Co., Boston, until he resigned to become associated in the new position with Baldwin.

Bookings of Chasses for Electric Trucks Increase

Domestic bookings of electrical industrial trucks and tractors during March totaled 575 units, according to the Electric Industrial Truck Association, Chicago. Net value of chasses only booked in March amounted to $2,667,140.92 compared with $1,081,163.50 in February.

Spring Company Acquired By Pittsburgh Steel Foundry

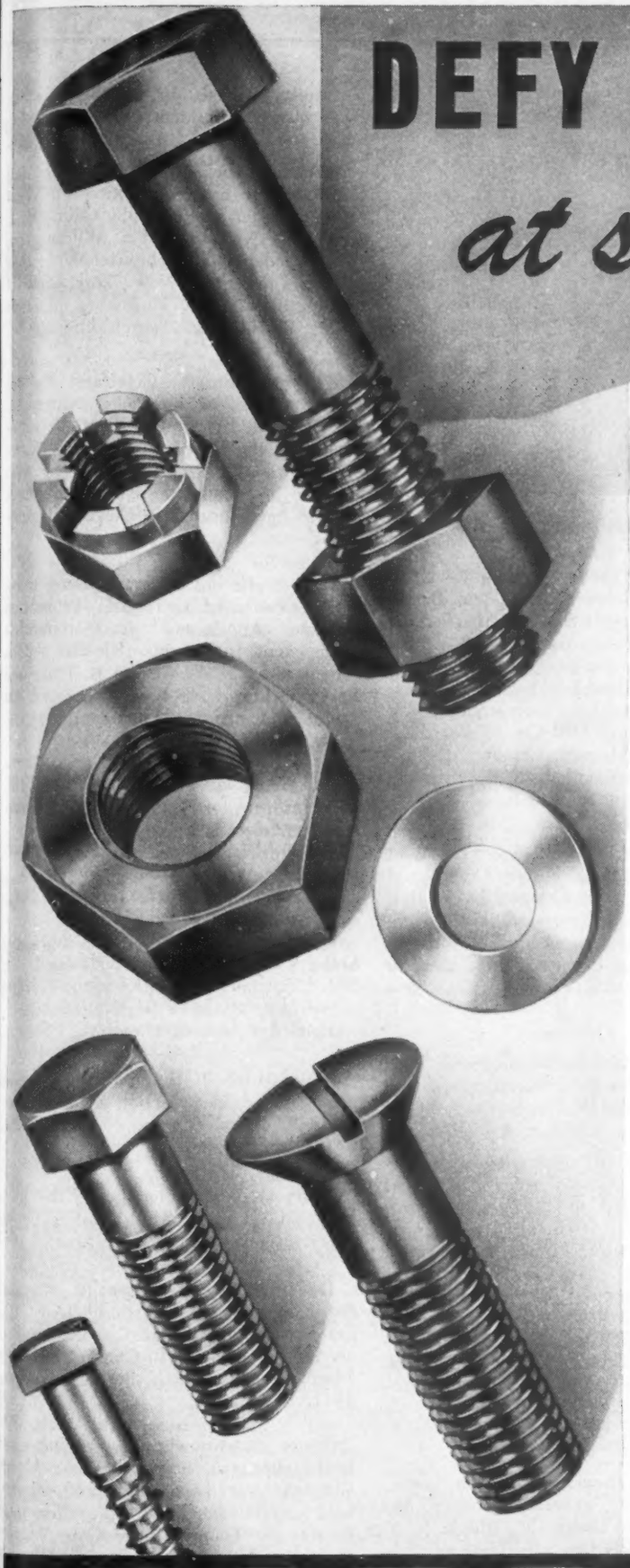
Pittsburgh Steel Foundry Corp., Glassport, Pa., has acquired controlling interest in the Pittsburgh Spring & Steel Co., Pittsburgh. The latter company will be operated under its present corporate name as a division of Pittsburgh Steel Foundry Corp.

Officers named for the Pittsburgh Spring Division are: G. D. Thompson, president, who also is president and board chairman of Pittsburgh Steel Foundry Corp.; E. S. Weidle, vice president; M. A. Colvill, treasurer; Winthrop B. Braun, secretary; and David W. Kettering, assistant secretary-treasurer. Directors are: Mr. Thompson, chairman; Grant Shipley, Ralph Dimmler, J. A. Flynn, and Mr. Braun.

American Bridge Co. Ship Program Nears Completion

The shipbuilding program at U. S. Steel Corp's. American Bridge Co. plant and Navy shipyard, Ambridge, Pa., is nearing a close, with the last of 143 Navy ships scheduled for delivery by mid-July. By the end of the summer, employment will have dropped from a wartime peak of 15,400 to 3000. Present employment is 8300, of whom 6600 are employes of American Bridge. The others work for four subcontractors.

The War Manpower Commission announced that jobs are open immediately in the Pittsburgh district for all those made available for employment by completion of this phase of the Navy shipbuilding program.



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RICHARD H. ROWLAND

Basil M. Graham has been elected president, Central Iron & Steel Co., Harrisburg, Pa., succeeding the late **Henry S. Evans.** In addition he was elected a member of the executive committee. Mr. Graham has been vice president of the company since 1941. He joined Central as comptroller in 1922 and has been a member of the board of directors since 1934. He was elected secretary and treasurer in 1939 and vice president in 1941. Prior to his appointment as general superintendent in 1940 he was chief engineer.

Other officers elected are: **A. E. Eck,** who has been named vice president, and **J. E. Jones,** who has been elected secretary and treasurer. Mr. Eck has been general superintendent and Mr. Jones has been assistant secretary and assistant treasurer. Another appointment in the company is that of **William F. Zerbe,** formerly assistant general superintendent, who has been named general superintendent.

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Robert E. Rutzen has been appointed foundry superintendent, Wilson Foundry & Machine Co., Pontiac, Mich.

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Bert E. Brashares, formerly in the Steel Casting Sales Division, Jones & Laughlin Steel Corp., Pittsburgh, has joined the sales force, Ohio Steel Foundry Co., Lima, O. Mr. Brashares will specialize on miscellaneous steel casting sales for the Lima plant.

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Elmer A. Terwell has been appointed assistant manager of the Chicago plant, Salkover Metal Processing Co., Chicago. Mr. Terwell was connected for 20 years with the Chicago office of Driver-Harris Co., Harrison, N. J., and also served in 1938-1941 as secretary-treasurer of the Chicago chapter, American Society for Metals, Cleveland.

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Walter H. Funk has been added to the sales staff, Rustless Iron & Steel Corp., Baltimore. Mr. Funk formerly was with American Rolling Mill Co., Middletown, O. **Edward L. Kelly,** who previously was connected with Reynolds Metals Co., Richmond, Va., and Butler Bros., Baltimore, has been assigned to the Rustless New York district office. **Eric M. Arndt** now serves as field service engineer in Milwaukee, having previously been Milwaukee representative for American Rolling Mill Co. **Edward G. Cressell,** formerly with Crosby Co., Chicago, has been added to the Rustless Chicago territory sales staff.

—o—

Richard H. Rowland, vice president in charge of National Battery Co.'s Gould Industrial Division, Depew, N. Y., has assumed the added responsibility of general sales manager, succeeding **John C. Sykora** who has been appointed director of sales, Portable Products Co., New York.

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H. L. Boyle has been elected vice president in charge of purchasing, Deere & Co., Moline, Ill.

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J. M. Crawford, chief engineer, Chevrolet Motor Division since 1929, has been transferred to the central office engineering staff, General Motors Corp., Detroit, as assistant to **C. L. McCuen,** vice president. Mr. Crawford is president of the Society of Automotive Engineers. **John G. Wood** succeeds Mr. Crawford as chief engineer of the Chevrolet Motor Division, and **Edward H. Kelley,** formerly chief engineer of Chevrolet's Aviation Division, has been named assistant chief engineer.

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Frank M. Hawley has been named vice president, general manager and director, Morse Chain Co., Ithaca, N. Y. He was formerly vice president and manager of the Detroit plant. **Stanley B. Waring,** formerly secretary, has been elected secretary and treasurer.

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C. W. Sherman has been elected chairman, Dominion Foundries & Steel Ltd., Hamilton, Ont., Canada. He had been president since the formation of the company 33 years ago. **F. A. Sherman** has been elected president.

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Albert R. Tucker has been appointed to the newly created position of West Coast manager, at El Monte, Calif., E. I. du Pont de Nemours & Co., Wilmington, Del. **Frederick C. Schumacher,** former assistant manager, New York district office, succeeds Mr. Tucker as manager of the Philadelphia district office.

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Walter B. Smyth, Cleveland district sales manager, Midvale Co., Nicetown, Pa., celebrated on June 1 his 50th anniversary in the steel business. Practically his entire business career has been with Midvale and its predecessor companies. He has been located in Cleveland since 1904.

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A. L. Scaife has been appointed manager, Advertising and Sales Promotion Division, Appliance and Merchandise Department, General Electric Co., Schenectady, N. Y. **George B. Park** and **E. F. Vickery** have been appointed assistant and operating manager, respectively, of the division.

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Dr. Henry T. Heald, president, Illinois Institute of Technology, Chicago, has been elected president, Western Society of Engineers, Chicago.

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Raymond T. O'Keefe Jr., vice president in charge of industrial relations, Kropp Forge Aviation Co., Chicago, and industry panel member of the War Labor Board, has been appointed to the National Advisory Board of the National Association of Personnel Directors, Chicago.

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John Mitchell has been appointed manager, products section of the Alloy Sales Division, Carnegie-Illinois Steel Corp., Pittsburgh.

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Harry D. Wagner has joined the Foxboro Co., Foxboro, Mass., staff of engineers serving the Cleveland area.

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Donald M. Fraser, assistant geologist, Bethlehem Steel Co., Bethlehem, Pa., has been appointed chief geologist, succeeding the late **W. L. Cumings.** He has been associated with Bethlehem since 1941.

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James S. Knowlson, president and board chairman, Stewart-Warner Corp., Chicago, has been appointed central field commissioner for the European theater by **Thomas B. McCabe,** Army-Navy liquidation commissioner. His new duties will be to dispose of Army-Navy surplus materials in the European area. Mr. Knowlson was vice chairman of the War Production Board in 1941 to 1943.

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Emery B. Hatch of Melrose, Mass., has been appointed representative for the New England territory, Ferry Cap &

Set Screw Co., Cleveland. **Edward C. Swan Co.,** Denver, has been appointed the company's representative for the states of Colorado, Idaho, Montana, New Mexico, Utah and Wyoming.

—o—

L. R. Keltner has been named superintendent of the Akron plant of the Tire Division, B. F. Goodrich Co., Akron. He has been associated with the company since 1926. **Hugh M. Rumbaugh** and **Irvin J. Fox** have joined the auto and home supplies department of the company. **Maj. Dale Kramer** has rejoined the sales personnel service department of the Goodrich firm. **Fred A. Lang,** merchandise manager, Industrial Products Sales Division, has completed 20 years service with the company.

—o—

T. U. Blake has been appointed chief engineer, B. F. Goodrich Chemical Co., Cleveland. Previous to his new assignment, Mr. Blake was plant engineer at the government's Goodrich-operated synthetic rubber plant in Port Neches, Tex.

—o—

Victor R. Willoughby, vice president and director of research and development, American Car & Foundry Co., New York, is retiring after an association with the company of almost 50 years.

—o—

Alfred Anderson, who formerly worked in the laboratories of Linde Air Products Co., New York, has been appointed tool engineer, Philadelphia office of Kennametal Inc., Latrobe, Pa. **Gilbert A. Bunn,** formerly assistant superintendent of the torpedo plant and general foreman of the rear axle department of Pontiac Motor Division, General Motors Corp., has been appointed tool engineer in Kennametal's Detroit office. **Jack Wright,** formerly production foreman at Brown & Sharpe Mfg. Co., Providence, R. I., has been appointed tool engineer in Kennametal's West Hartford, Conn., office.

—o—

J. C. Schaefer, field engineer, Allis-Chalmers Mfg. Co.'s Pittsburgh district office, has been appointed branch office manager at Youngstown, O. He succeeds **E. H. Legler** who has been transferred to the electrical department at the home office at Milwaukee. **L. E. Stacey,** field engineer of the Pittsburgh office, has been transferred to Wheeling, W. Va., as resident field engineer.

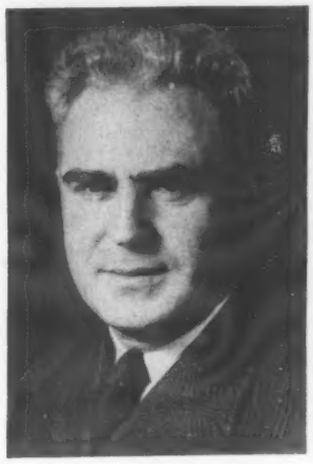
—o—

William G. Bostwick has joined the Precision Welder & Machine Co., Cincinnati, as chief electrical engineer. Mr. Bostwick until recently was chief electrical engineer of Federal Machine & Welder Co., Warren, O.

—o—

Samuel Moment, Bonneville Power Administration economist, and prior to that a government economist identified with the investigation of the Temporary National Economic Committee, has been transferred to the Surplus Property Board, Washington, to investigate and report on disposition of government-owned aluminum and alumina producing facilities.

ERIC W. PETERSON



LEO F. McCAFFREY

—o—

Eric W. Peterson has been appointed chief engineer, Kaydon Engineering Corp., Muskegon, Mich. He has been chief engineer, Ditto Inc., Chicago, for the past six years and previously served as industrial engineer, Remington Arms Co., Ilion, N. Y., and as supervisory engineer on new machine and product developments with International Business Machines Corp., Endicott, N. Y.

—o—

Fred M. Sime has been appointed district sales manager for the Pacific southwest, Macwhyte Co., Kenosha, Wis. **William J. Brett** has been named district sales manager for the Pacific northwest by the company.

—o—

F. D. Haberkorn has been appointed assistant sales manager, Central Sales Division, Caterpillar Tractor Co., Peoria, Ill.; **C. A. Barabe Jr.** has been named assistant sales manager, Eastern Sales Division. **F. E. Rusher** has resigned as assistant sales manager, Central Sales, to become general sales manager and a director, Peoria Tractor & Equipment Co., Peoria.

—o—

Walter S. Johnson has been elected president, Friden Calculating Machine Co., San Leandro, Calif., succeeding the late **Carl M. Friden. John M. Lund** was named executive vice president and general manager and **Charles T. Gruenhagen** was made secretary.

—o—

Lieut. Col. Myles Stolz, formerly advertising and sales promotion manager, Osgood Co. and the General Excavator Co., Marion, O., has been awarded the Bronze Star Medal for "meritorious service in connection with operations against the enemy" while with the 15th Air Force in Italy.

—o—

Dr. A. B. Greninger has been appointed metallurgist, chemical department, General Electric Co., Schenectady, N. Y. He has been associated with the company since 1941 and for two years has been doing special war work.

—o—

Leo F. McCaffrey has joined Allis-Chalmers Mfg. Co., Milwaukee, as an industrial engineering specialist and will head the metal industries activities of the industrial sales department, General Machinery Division. He was formerly assistant works manager in charge of operations, Algoma Steel Co., Ontario, Canada. His previous associations included those with Jones & Laughlin Steel Corp., Pittsburgh; Crucible Steel Co., Midland, Pa.; Weirton Steel Co., Weirton, W. Va.; Otis Steel Co., Cleveland; and Ford Motor Co., Dearborn, Mich. He has also served as a special consultant to the operating vice president, Steel Co. of Canada Ltd., Hamilton, Ont.

—o—

Robert Wier Jr. has been appointed general sales manager, Brush Division, Osborn Mfg. Co., Cleveland. Mr. Wier formerly was sales manager, Western Cartridge Co., East Alton, Ill.

—o—

Nathan Alexander has been elected vice president in charge of purchasing, American Safety Razor Corp., Brooklyn, N. Y.; **Louis Klein,** secretary and controller, and **Jay P. Davis,** assistant controller.

—o—

Robert C. Thumser has been promoted to plant engineer, John F. Queeny plant of Monsanto Chemical Co., St. Louis. **W. C. Durning** was advanced to superintendent of the power plant and **Norville Predock** has been named superintendent of maintenance and construction. The changes have been made in anticipation of the retirement of **W. D. Pourie,** chief plant engineer.

—o—

Frank M. Cashin, eastern divisional sales manager, Permanente Metals Corp., Oakland, Calif., has been appointed general sales manager. He succeeds **Bert Inch** who has been transferred to the

MEN of INDUSTRY

ALEXANDER C. NAGLE

Who has been elected director and member of finance committee, U. S. Steel Corp., as noted in STEEL, May 14, p. 94

RUSSELL L. PETERS

Who has been elected treasurer, Inland Steel Co., Chicago, as reported in STEEL, May 7, p. 94.

JOHN KENNEDY BEESON

Who has been elected executive vice president, Pittsburgh Steel Co., Pittsburgh, as noted in STEEL, June 4, p. 95

Kaiser Co. Inc., Fontana, Calif., where he will be project manager.

—o—

Emery J. Stevenson has been elected secretary-treasurer, Wheelco Instruments Co., Chicago. He was formerly associated with Moody's Investors Service, New York.

—o—

Elliott G. Ewell has been appointed vice president and manager, Southern Division, Mack-International Motor Truck Corp., Long Island City, N. Y. **L. D. Marshburn** succeeds Mr. Ewell as the corporation's branch manager at Charlotte, N. C.

—o—

Walter B. Riley, Champaign, Ill., attorney, has been elected secretary-treasurer, Clifford-Jacobs Forging Co., Champaign. Mr. Riley succeeds the late **Hazen S. Capron. Francis H. Bachman,** comptroller, was also named assistant secretary-treasurer.

—o—

Llewellyn W. Smead has been appointed assistant branch manager in Buffalo for the Ford Motor Co., Dearborn, Mich. He was formerly Ford's sales manager in Buffalo.

OBITUARIES . . .

William L. Dankmeyer, 67, assistant treasurer, Allegheny Ludlum Steel Corp., Brackenridge, Pa., died May 27, at his home in Aspinwall, Pa. Mr. Dankmyer was elected assistant treasurer in April, 1939 and had been with the corporation 33 years.

—o—

Cary D. Terrell, who retired in 1938 as vice president in charge of the Chicago district, American Car & Foundry Co., Chicago, died June 2 in Shreveport, La.

—o—

Henry A. Hallett, 49, Rockford, Ill., field engineer for the Diamond Tool Co., Chicago, died June 2 in a LaSalle, Ill., hospital as a result of injuries sustained in an automobile accident.

—o—

Fred A. Stewart, plant superintendent, National Malleable & Steel Castings Co., Cleveland, died June 4 in that city. Mr. Stewart entered the employ of the company in 1909.

—o—

Donald J. Hutchinson, 49, assistant treasurer, Chrysler Corp., Detroit, died May 31 in San Francisco.

—o—

George Tilley Seabury, 65, executive head, American Society of Civil Engineers for 20 years, died recently in New York.

—o—

Felix J. Trainor, 65, president and general manager, Trainor National Spring Co., New Castle, Ind., died recently.

—o—

Frederic J. Arthurs, 65 president, Arthurs Buffalo Chemical Inc., Buffalo, died May 23 in that city.

—o—

Hervey Lindley Kitchin, 41, office manager, Consolidated Steel Corp., Los Angeles, died May 29 in that city.

—o—

John E. Jackson, 51, general patent attorney for United States Steel Corp., New York, died in Los Angeles May 27.

—o—

Walter C. Borgstede, 76, for more than 20 years secretary, Wrought Iron Range Co., St. Louis, died recently.

—o—

John D. LeFrank, 52, Amertorp Corp., St. Louis, died suddenly May 26 in that city. Mr. LeFrank was manager of one of the corporation's plants.

—o—

George S. Hobbs, 86, treasurer, Southworth Machine Co., Portland, Me., died June 2 in that city.

—o—

Thomas A. Wright, 58, president, Lucius Pitkin Inc., New York, died May 25 in Plainfield, N. J.

—o—

Theophilous C. Dube, 82, owner of Dube Boiler Works, Chicago, died May 31 in that city.

—o—

William H. Symonds, 69, chairman, W. D. Allen Mfg. Co., Chicago, died June 1 in Evanston, Ill. Mr. Symonds had been associated with the company 50 years and served as president from 1933 to 1944.

—o—

Edward F. Huston Sr., 52, part owner, Ideal Metal Products Co., Chicago, died May 31 in that city.

—o—

Mrs. Gertrude Denzin, 61, secretary and treasurer, Regnille Tool & Engineering Co., Milwaukee, died in that city June 1.

—o—

William C. Hasslinger, 36, superintendent of the naval ordnance plant, A. O. Smith Corp., Milwaukee, died June 1 in that city.

—o—

William F. Whitney, 62, mechanical superintendent, American Brass Co. Ansonia, Conn., since 1912, died recently at his home in that city.

—o—

Victor B. Wesson, 54, who was vice president, Smith & Wesson Co., Springfield, Mass., when he resigned in 1941 to become a lieutenant colonel in the Army ordnance department, died recently at Palmer, Mass.

—o—

C. Walter Spalding, manager, power transmission machinery, Link-Belt Co., Chicago, with headquarters at the company's Ewart plant in Indianapolis, died May 25 in Chicago. Mr. Spalding began his association with the company in Indianapolis in 1910.

Deferred Demand Alone Insufficient To Maintain Prosperous Economy

Expanded productive capacity will impose heavier burden on sales managers in distributing greater output of goods. Favorable and unfavorable factors in postwar market picture analyzed by Republic Steel executive

DEFERRED demand for durable goods, both consumer and industrial, will fill only part of the gap which will be left when government war spending is sharply contracted. This demand can be satisfied in a few years at most and is insufficient alone to support a high level of postwar employment. Liberal spending from current income will be necessary to support a prosperous economy, and this will be a sales job.

This warning was voiced to the Sales Executive Club of Worcester, Mass., recently by L. S. Hamaker, assistant general sales manager, Republic Steel Corp., Cleveland.

Mr. Hamaker expressed optimism over the immediate outlook for durable consumer goods, but predicted the ending of the war will impose a heavier burden on sales executives. With capacity for production greatly increased as a result of the emergency, the postwar distribution problem will be vastly greater.

For industrial goods, such as steel and machine tools, the sales executive sees both favorable and unfavorable factors. One of the former is the rapid wearing out of many kinds of equipment during the war and the necessity for replacement. Railroads were cited as a prime example. Similarly, wear and tear has been enormous in factories and on farms, with little or no replacement. Improvements in machinery, intensified by war, will put an out-moded plant at a competitive disadvantage and force modernization. Farms are on the threshold of widespread mechanization and electrification.

Some May Lack Reserves

Some question exists, however, as to whether all industries have been able to accumulate the necessary reserves for replacements and additions to plant and equipment. Other unfavorable factors are over-expansion of some raw material producers and many fabricators; the unusual severity of plant and labor adjustments in some localities; and last, but not least, higher production costs.

"Unless the capital goods industries enjoy a development comparable to the boom in consumer goods," said Mr. Hamaker, "we will have no long-term prosperity."

The speaker advised sales executives to get all the available facts on sales possibilities and outlined his company's approach to this problem.

Another major postwar problem of the sales executive, according to Mr. Hamaker, will be the rebuilding of sales forces. He opined that any company that has on hand or within reach 50 per cent of its prewar sales force is in an excellent position.

Turning to the steel industry, Mr. Hamaker believed postwar problems would not be too serious.

The steel industry, he said, expects very good business by prewar standards for a number of years.

"The automotive industry will enter the peace with the largest backlog of unfilled demand in its history. Back in 1941, with 6 million unemployed, Americans were driving 29 million automobiles. By the end of this year we will be down to 22 million or less. The industry says it could sell 16 million cars if it had them. The record year was 5 million.

"Everyone anticipates a residential building boom, with estimates as high as one million new homes a year for ten years, and there is at least a ton of steel in even a small house.

"The railroads will be almost literally worn out and their deferred maintenance alone will require steel in large volume. The leading roads are planning to replace existing passenger equipment as rapidly as possible to counter the competition of the airlines. They plan high-speed, low-priced service for the travel boom which always follows war.

"The American farmer will come out of the war in the best financial condition in his history. In the recent war loan drives the ten top states in excess of quota were farm states. Small town banks nearly everywhere are embarrassed by the volume of demand deposits they are carrying. Farm mortgage debt is being retired before it is due. The farmer's income has been breaking records for several years, and it is estimated at $22 billion for 1944. While the prices of farm products will unquestionably decline, the farmers will represent a huge market for implements, buildings, fence, and many other products made of steel.

"There is a tremendous highway building program in prospect and much of the planning is already done. The trunk highways will be heavily reinforced with major intersections of the cloverleaf type, requiring very large tonnages of steel.

Sees Surplus Steel Capacity

"A rosy picture of the outlook can be painted and truthfully so, yet it is not all roses. I think there is little possibility that our 100 million tons of capacity can be fully employed for a good many years after the war, no matter how good business is. In 1943, we produced about 90 million tons. In the boom year of 1929, we produced 63 million tons. If, as is very likely, steel production drops to something approaching prewar levels, many problems will arise in determining which plants are to produce the steel. An even decrease in operating rates throughout the industry cannot be expected. For one thing, obsolescent plants which have been revived to meet wartime needs probably will be abandoned. In addition, it is possible that some of the new capacity, which in postwar will represent extreme overcapacity, such as plates for shipbuilding, will not operate at all. Some of the new plants built in the Far West, vital to the war program, will be seriously handicapped by high costs and distance from consuming markets."

GUARANTEED INCOME

Majority of 90,000 businessmen polled for their views on the subject favor some form of the guaranteed annual income, according to the United States Department of Commerce. However, most businessmen are opposed to compulsory action and are hoping that a study now under way by a special Presidential committee will help them to devise their own plans in co-operation with labor.

Businessmen participating in the poll said they favored regularization of production.

Expectations are the committee, which is headed by Eric Johnston, president, United States Chamber of Commerce, will not complete its study until the end of the year.

List of Patents Available For Licensing Established

The Patent Office in the Department of Commerce building, Washington, is establishing a public register of patents available for licensing, to aid manufacturers in finding new products for manufacture during the reconversion period, and after the war.

Registrations will be effected at the request of patent owners, it is stated, and will be published when registered, in the weekly official gazette of the Patent Office, which is available for review in many public libraries throughout the United States, and otherwise given wide circulation.

WING TIPS

Jet propulsion and gas turbine developments explored by aircraft engineers at conference sponsored by Army Air Forces and General Electric Co. Predict rapid progress in both military and civilian aviation

JET propulsion and gas turbine developments, already blazing a meteoric trail of super-power and lightning-like speed into a new era for aerial operations, were analyzed on a creative blueprint basis in scientific and technical details at a conference recently sponsored by the Air Technical Service Command of the Army Air Forces and General Electric Co. at New Ocean House, Swampscott, Mass.

Attended by 200 engineers of the major aircraft and engine companies in the United States and a delegation from England, the conference was the first one of its scope on jet propulsion ever held.

This conformed with purposes of the Air Technical Service Command to stimulate new advances in jet propulsion and gas turbines through the pooling of facts and ideas on the harnessing of this dynamic motive force for airplane power plants.

Attention throughout the conference was focused by air power authorities on the record breaking accomplishments already achieved in jet propulsion under wartime pressure, and on other outstanding forward developments now pointing directly toward new and unprecedented aerial progress.

General Electric engineers who designed and developed the super G-E Jet, which now drives the Army Air Forces Lockheed P-80 fighter faster than any other plane will fly, explained and demonstrated many jet propulsion accomplishments and discoveries.

These included classified performance facts of the G-E Jets, discussion of gas turbines for potential propeller drive on aircraft, combustion developments, metallurgical advancements, various air compressor designs, and the intricate sequence of test these new-type engines must undergo from factory to flights.

Air Technical Service Command and Navy officers and other engineers contributed specific facts on elements dealing with jet propulsion and gas turbine developments and uses, some of them far-reaching in their military and civilian significance.

Fundamental progress made by aircraft companies in designing and developing planes to be driven by jet engines or gas turbines also was given in detail by leading engineers of several aircraft companies, including Bell, Douglas, Lockheed, Republic, Ryan and Vultee.

Swift Development Expected

Much of this information still is classified as secret or confidential for reasons of war security. However, the censensus among the engineers at the conference unqualifiedly was that jet propulsion and gas turbines would develop swiftly into the basic power units of both military and civilian aviation.

The general expert opinion along this line was that the jet engine already was the ideal power unit for fighter planes, where speed was the major factor, while the gas turbine harnessed to a propeller with auxiliary jet would develop into the power plant for transport and cargo aircraft, including those designed for transoceanic and transcontinental operations.

Basing his statements on established facts, a verbal picture of air power of tomorrow was drawn graphically by R. G. Standerwick, General Electric engineer who directed the designing and development of the super G-E Jet. He emphasized that knowledge gained by engineers under wartime demands would give tremendous impetus to aircraft transportation—actually revolutionize it.

"I have in mind low-priced private planes of reasonably high economy, powered by gas turbine-driven propellers, and helicopters with jet propulsion gases being emitted from the trailing tips of the propeller blades," Mr. Standerwick said. "These will be for both private and delivery purposes. Large commercial freight lines and passenger lines will be employing planes powered by gas turbine propeller power plants."

Mr. Standerwick said that the great interest already exhibited by airplane companies in huge planes for transcontinental and transoceanic transport called for units that would produce enormous power. He said gas turbines would fill that bill. He explained that gas turbines driving propellers, "augmented by the correct proportion of jet propulsion," would be the solution of this power problem.

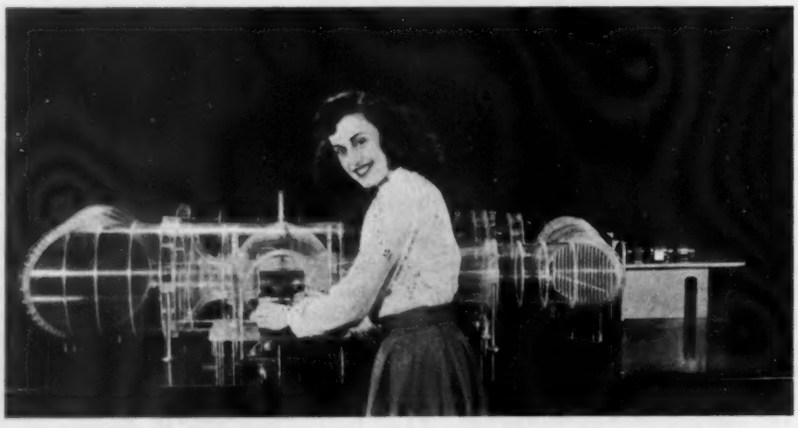
"Transportation both by sea and land also will benefit greatly by our fundamental accomplishments with the gas turbine," Mr. Standerwick continued, "but I refrain from prophesying that pure jet propulsion is feasible for powering automobiles, although I predict that in time, small gas turbines will be the mode of power."

Engineers See Tests

The American and British engineers, and officers visited the test and development sections of General Electric River works at Lynn, Mass., where the super G-E Jet was developed, and where the first jet engine in the United States was produced from a basic British design. This first G-E Jet powers the Bell P-59A trainer for the Army Air Forces, and it was the first jet plane in the U. S.

Engines viewed in this plant undergoing tests and in the process of assembly are being produced for both the Army Air Forces and the Navy. Allison Division of General Motors also is producing the super G-E Jet for the AAF.

The engineers inspected a cutaway of the super G-E Jet and the operation of this simple engine with its one moving part was explained in detail. Air rams into the front of it while in flight, a compressor whips the air to a series of combustion chambers. There intense and steady heat is created by the burning of fuel, usually kerosene. Velocity of the air and gases is increased tremendously. The blazing hot air and gases then pass through a turbine, which is connected by shaft with the compressor-impeller. This turbine spins thousands of times a minute in a temperature of more than 1200 degrees Fahr. The air then passes out the exhaust, releasing the reactive force which drives the airplanes forward.



MODEL WIND TUNNEL: Lucite working replica of Curtiss-Wright Corp.'s new $2,500,000 variable density wind tunnel at Buffalo is built to 1/30th scale and duplicates in every detail, the operation of its "big brother". The big tunnel, soon to be in operation at the Curtiss-Wright research laboratory, contains a highly flexible range of testing conditions

This happens to the best galvanized sheets...

Galvanized sheet steel is an excellent metal for many purposes, but there is one thing it won't do. It won't take and hold paint satisfactorily. The photo tells the story. The raw surface dried out the essential oils in the paint, caused it to become brittle. Result: early paint failure.

This happens even when the zinc surface is acid-etched. Etching has other disadvantages, too. Besides being troublesome and costly, it destroys part of the protective zinc coating.

Paint on regular galvanized steel *isn't* satisfactory . . .

But this bonds paint to zinc

ARMCO Galvanized PAINTGRIP sheets are the answer to this old problem. What's more, they give your products this *triple protection* . . .

1 The steel base has a *full-weight coating of zinc.*

2 The coating is given a special Bonderizing treatment at the Armco mills.

3 This "insulated" surface grips the paint finish in a lasting bond—prevents it from drying out quickly, retards peeling.

Whatever you make of galvanized steel that is to be given an *attractive and durable* paint or enamel finish, ARMCO Galvanized PAINTGRIP sheets are the logical choice. Write for the free PAINTGRIP booklet. It gives complete information. Just address The American Rolling Mill Company, 1431 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

The "Scratch Test" shows how paint sticks to ARMCO Galvanized PAINTGRIP Steel. The top half of the sample is mill-Bonderized and when scratched with a pen knife only a slight mark can be seen. Paint on ordinary galvanized (bottom half) scrapes off readily.

The American Rolling Mill Company

SPECIAL PURPOSE SHEET STEELS

GALVANIZED PAINTGRIP ARMCO STEEL

Helicopter's Intermeshing Rotor System Eliminates Necessity for Tail Rotor

FIRST public information concerning the XR-8 helicopter has been released by Kellett Aircraft Corp., Upper Darby, Pa. The new aircraft is described as having a novel synchronized intermeshing rotor system.

Blades of the two-place XR-8 are arranged in two pairs of three blades each and overlap as they rotate in opposite directions, somewhat in the same manner as the housewife's egg beater. This design eliminates the necessity for a tail rotor to counteract torque.

Among the advantages claimed are power efficiencies, good vibrational characteristics and reduction of aerodynamic drag and power-transmission requirements. The XR-8 is exceedingly maneuverable, having the conventional helicopter characteristics of vertical rise and descent, ability to hang motionless in flight at average altitudes and to fly backwards or sidewise, as well as forward.

The first flight of an XR-8 occurred on Aug. 7, 1944, in a small area with dimensions of 220 feet by 450 feet, adjacent to the Kellett plant. The entire test program has been carried on from this small area without difficulty. Since the first flight, engineering tests have been conducted to develop basic information on the intermeshing helicopter type and these are continuing. A substantial number of flying hours have been logged and cross-country flights made.

The first XR-8 has had one emergency landing—a sudden spring thunder shower caused the pilot to decide to land in a cemetery in a heavily built up suburban area. He waited until the storm had passed and then resumed his flight without further incident.

It is emphasized that the XR-8 is a military experimental design and that the company is not contemplating a production program on this design, although later models are expected to incorporate the intermeshing, synchronized-blade arrangement.

The company is basing its program on the conviction that a substantial amount of additional engineering and flight test experience will be required to establish the helicopter for every-day usefulness, although specialized applications are possible immediately.

Kellett is currently engaged on other helicopter projects while continuing its program on the XR-8.

Kellett XR-8 helicopter, an experimental unit for the United States Army Air Forces, has a novel synchronized or intermeshing rotor system

Douglas Produces 10,000th DC3-Type Air Transport

Douglas Aircraft Co., has produced 10,000 units of its DC3-type transport.

Under its various *nomes de guerre*—C-47, C-53, Skytrain, Skytrooper, Dakota (British)—the unarmed DC3 has spearheaded every invasion, performed logistic miracles in the timely delivery of vital supplies, evacuated wounded and carried out countless other mercy missions in every quarter of the globe.

At one time under production at three of the company's six major plants, the DC3 is now built only at Oklahoma City, Okla.

Sees Postwar Industries Devoted to Jet Propulsion

The day of jet propulsion and rocket power is dawning and its effect upon civilians will be enormous, members of the Tau Beta Pi chapter of Iowa State College were told recently by G. Edward Pendray, secretary of the American Rocket Society and assistant to the president, Westinghouse Electric Corp., Pittsburgh.

"New altitudes and new velocities for flight, new power for aircraft and new devices as important and revolutionary to human life as the airplane itself will be provided by this new motive power," Mr. Pendray said.

Mr. Pendray's latest book, *The Coming Age of Rocket Power*, has just come off the presses of his New York publisher.

"With the Navy spending $100,000,000 a month for rockets, the Army also using rockets on a large scale, and millions being spent in the development of jet propulsion engines and airplanes, we can no longer look upon rocket power as a dream of the future," he continued. "New postwar industries will spring from this enormous wartime development of rockets, rocket motors, jet propulsion planes and gas turbines. The size of the new industries will depend largely on the progress our engineers and scientists are able to make during the remainder of the war."

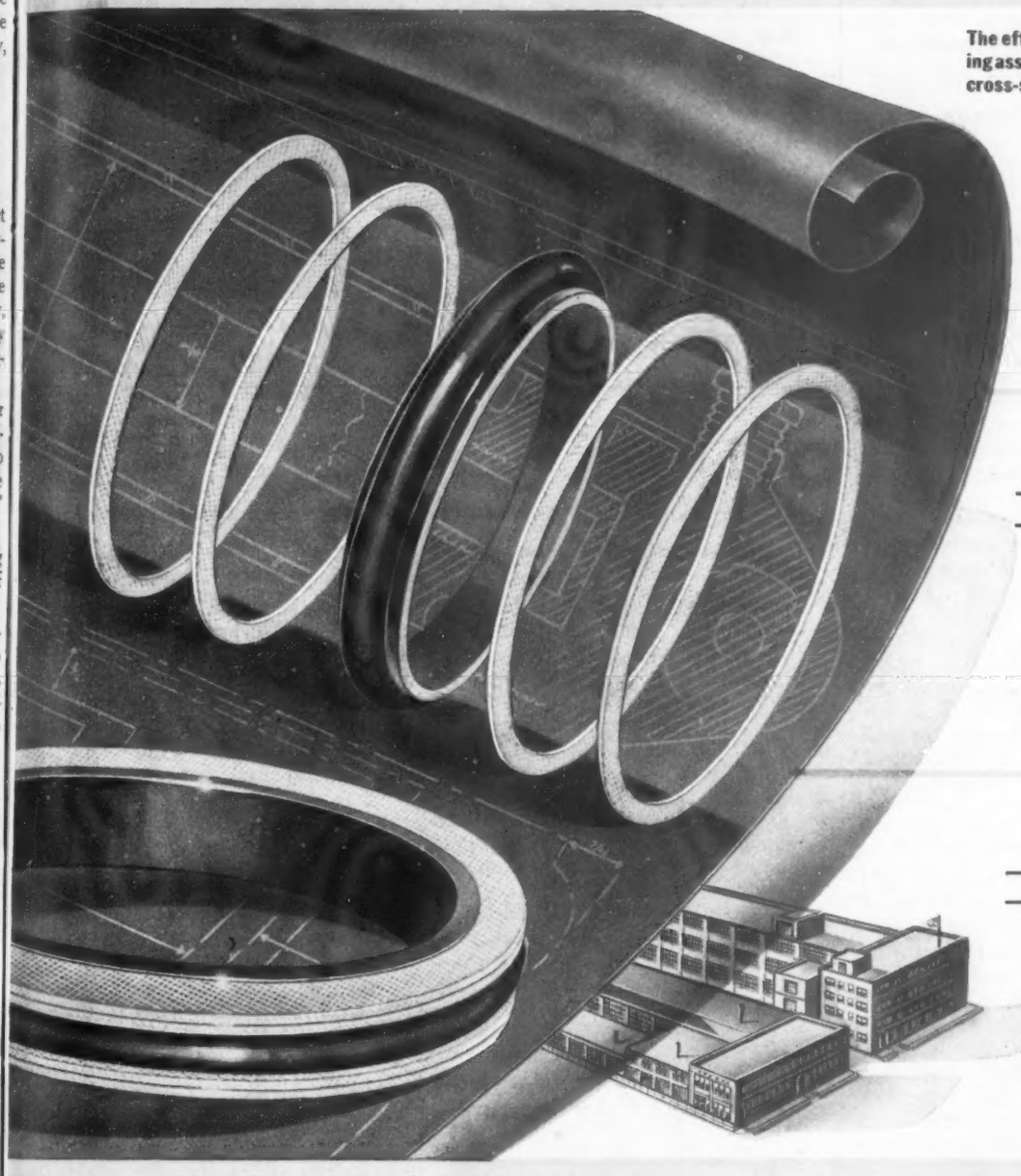
Employment in Coast Plane Plants To Shink Soon

Recent cutbacks in aircraft contracts on the West Coast indicate employment in California plane plants within the next few months will be reduced to around 130,000. In April, before the cutbacks were announced, aircraft workers dropped 3600 and stood at 156,100 at the end of that month, on the basis of latest available information.

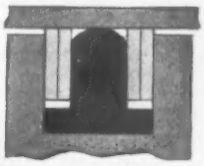
Shipyard reductions in payrolls up to the end of April continued to run heavy. The decline in April, in private yards, was 21,400 bringing the total at the month-end to 169,600. This compares with 253,000 at the end of April, 1944.

In the midst of this declining shipyard employment, the need for workers in ship repair yards is growing steadily. This apparent paradox results from the fact that many people leaving private shipyards are going back to prewar homes.

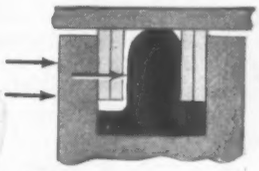
Improved WEATHERHEAD T-RING PACKING



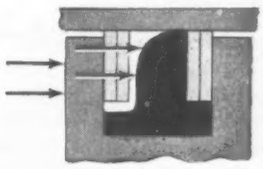
The efficiency of the T-ring Packing assembly is shown by the three cross-sectional panels below.



1 Packing before pressure is applied. Note clearance between the flanges and the guard rings.



2 Packing upon immediate application of pressure which swells the flange under the farther guard ring and against cylinder wall.



3 Full application of pressure. Guard rings are held tightly against cylinder wall — no binding or jamming.

Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO
Plants: Cleveland, Columbia City, Ind., Warsaw, Ind., Los Angeles
Canada—St. Thomas, Ontario

The problem of properly sealing fluids in many types of machines is an important one. The new, improved Weatherhead T-ring Packing, recently patented, meets the requirements for both standard and special applications. This seal is available in two types and in sizes varying from ½ inch to 4 inch O. D. For information or literature write or phone any Weatherhead branch office.

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Bretton Woods Group Formed By Businessmen

Committee to give expression to those interested in enlarged opportunities for trade with foreign nations

THE BUSINESS and Industry Committee for Bretton Woods Inc. has been organized, with Ralph E. Flanders, Jones & Lamson Machine Co., Springfield, Vt., as chairman and a membership of more than 100 executives from all parts of the country.

The committee has been formed "tc give expression to the views of what we believe to be the majority of American businessmen who are interested in enlarged opportunities for foreign trade and their favorable effect on the American economy as a whole," Mr. Flanders said.

In a recent statement, Mr. Flanders declared that the committee has in preparation a series of reports on what Bretton Woods means to various industries.

"To most business men, international finance is a mysterious domain," he explained. "Much of the discussion in the Bretton Woods agreements up to now has served only to obscure further the real meaning and purposes of international monetary, financial and economic co-operation."

Expanded World Trade Is Goal

In his opinion the whole subject should be placed in truer prospective. "Without the machinery to eliminate risks in international trade and to establish a procedure for the orderly handling of exchange transactions, we could not realize our goal of vastly expanded world trade. We realize that Bretton Woods agreements were only incidentally a technical banking problem and that they most fundamentally affected manufacturers and others engaged in the production and sale of goods," he asserted.

The committee, he emphasized, is not opposed to such changes as have been suggested by the Committee for Economic Development, designed to clarify the agreements, but is against changes "which would endanger the very basis of international economic co-operation to which 44 nations agreed at Bretton Woods."

Active in the organization of the committee were: Henry P. Bristol, president, Bristol-Myers Co., New York; C. H. Hilton, president, Hilton Hotels Inc., New York; Emmet J. McCormack, vice president and treasurer, Moore-McCormack Lines Inc., New York; and Walter H. Wheeler Jr., president, Pitney-Bowes Postage Meter Co., Stamford, Conn., among others.

Marking the 50th year in the bolt and nut manufacturing industry for James Fennerty Donahue, vice president, Lamson & Sessions Co., Cleveland, a testimonial luncheon and dinner reception was held in his honor recently by representatives of the American Institute of Bolt, Nut & Rivet Manufacturers. Mr. Donahue began his career as an office boy with the Oliver Iron & Steel Co. in 1895. From 1903 to 1908 he was secretary and general sales manager of the Newcastle Forge & Bolt Co., Newcastle, Pa. From 1908 to 1920 he was western sales manager of the Russell, Burdsall & Ward Bolt & Nut Co. and then became vice president and later president of the Foster Bolt & Nut Mfg. Co. In 1930, Foster was merged with Lamson & Sessions and Mr. Donahue became a vice president of the latter firm.

J. F. DONAHUE

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Detrex Corp., Detroit, has established new and larger Pacific Coast offices at 318 West Ninth Street, Los Angeles 15.

—o—

Pullman-Standard Car Mfg. Co.'s. arsenal at Hammond, Ind., has averaged in the last ten months only .33 lost time accident for every million man-hours worked, and has retained the first-prize winning pace established last year in the Fabricating Division, Metals Section, contest of the National Safety Council.

—o—

Manhattan Rubber Mfg. Division of Raybestos-Manhattan Inc., Passaic, N. J., has issued a new catalog of friction materials for industrial machinery.

—o—

Reliance Electric & Engineering Co., Cleveland, has started a comprehensive three-year plan of cost reduction, product redesign, and sales design.

—o—

New York's metropolitan area will experience no more than a 10 per cent reduction in war production this year, Lewis S. Greenleaf Jr., regional director of the War Production Board, predicted. His estimate is based on "diversity of production in the area."

—o—

American Iron & Steel Institute, New York, has published a 244-page book, "Fire Protection through Modern Building Codes," to help improve understanding of fundamentals of fire protection regulation and to provide information on the nature and severity of fire hazards.

—o—

U. S. Bureau of Mines is ordering equipment for its $1,500,000 oil-shale demonstration plant to be built near Rifle, Colo. The plant will be a proving ground for processes being developed to convert oil shale into an auxiliary source of liquid fuels and lubricants.

—o—

American-Marietta Co., Chicago, has purchased the Ottawa Paint Works Ltd., Ottawa, Canada.

—o—

Conlon Corp., Chicago, has announced its distribution set-up for peacetime selling of household washers, ironers, and other products has been perfected for the South and the area from the Mississippi river to the Pacific coast.

—o—

Sheffield City Libraries, Sheffield, England, has issued a select bibliography of "British Industry and Commerce: Its History and Reconstruction."

—o—

Federal Shipbuilding & Dry Dock Co., Kearny, N. J., reports that a bottleneck in shipbuilding resulting from lack of riveters, bolters, reamers, and drillers is causing reductions in the number of employes at its shipyards at Kearny and Port Newark, N. J.

—o—

Wickwire Spencer Steel Co., New York, will aid the Seventh War Loan drive by holding at Hotel Biltmore, New York, an auction of original caricature paintings used for the company's institutional advertising campaign of 1942-1944. Each picture will be auctioned individually and will go to the highest purchaser of war bonds.

—o—

Perfect Circle Co., Hagerstown, Ind., announced that its Richmond, Ind., plant has received a certificate of approval

from the American College of Surgeons indicating that the plant's medical service complies with or exceeds the minimum standards in industry.

—o—

Jessop Export Sales Corp., subsidiary of Jessop Steel Co., Washington, Pa., has been incorporated under the laws of Delaware to handle export sales and also to act as importing agent. Robert A. Parks, who has been Jessop's representative in Washington, will be general manager of the export company. Temporary offices are in the Bessemer building, Pittsburgh. Later, headquarters will be moved to New York.

—o—

Ferguson Co., Baltimore, has more than doubled the capacity of its plant by equipping an adjoining building. The company makes scientific instruments and laboratory supplies.

—o—

Lamneck Products Inc., Middletown, O., has been acquired by Clayton & Lambert Mfg. Co., Detroit, and will be operated as Clayton & Lambert Mfg. Co., Middletown Division, on a larger scale.

—o—

Carpenter Steel Co., Reading, Pa., has opened its new Cincinnati warehouse, 5137 Vine street, St. Bernard, O. K. L. Crickman, Carpenter's Southwestern manager, has charge of the warehouse.

—o—

Rockford Clutch Division, Borg-Warner Corp., has opened its new engineering laboratories at Rockford, Ill.

—o—

B. F. Goodrich Co., Akron, O., has located its St. Louis district offices, warehouse, and recap plant in a new building at 5051 Southwest avenue, St. Louis.

—o—

Crosley Corp., Cincinnati, has authorized a number of its larger distributors to repair, in their own service departments, Crosley sealed-in unit refrigerating systems which formerly had been sent to Crosley headquarters in Cincinnati for repair. Ultimate aim is to permit 100 per cent field repair of Crosley sealed-in refrigerating units.

—o—

Ergolyte Mfg. Co., Philadelphia, is building national jobber representation for its newly designed AC arc welders.

—o—

Products of Tomorrow Exposition has been given government approval for opening early in 1946 at Chicago. The exposition will be an annual event to provide a springboard for introduction of new products and new designs.

—o—

A. W. Hecker Co., Cleveland, has issued a brochure, "Men and Machines for Engineering, Tool Building, Production," giving a pictorial story of services the firm offers.

—o—

Western Pipe & Steel Co. has completed its wartime shipbuilding program with launching of its forty-eighth vessel at its South San Francisco yard. The yard will be converted to ship repair work and will need only 3000 employes, compared with a 13,000-peak in ship construction.

—o—

E. I. du Pont de Nemours & Co., Wilmington, Del., has applied to the War Production Board for permission to make a major expansion at its cellophane plant at Clinton, Iowa.

—o—

Rudolph Wurlitzer Co., Chicago, has leased two floors of Trico Products Corp.'s plant, Buffalo, and will use the space for production of undisclosed items under Rochester Ordnance District contracts.

—o—

Rust Furnace Co., Pittsburgh, has been awarded Navy department contracts for two stress relieving furnaces for Hunters Point, Calif. One furnace will be equal in size to the largest ever built and will be used for stress relieving the heaviest battleship turrets.

—o—

Aluminum & Brass Co., Lockport, N. Y., has been purchased by Howard R. Faust, president, and John J. Egan, vice president, of the R. G. Wright Co. Inc., Buffalo. Aluminum & Brass Co. has been owned and operated for more than 20 years by August F. H. Kohler.

General Electric Co. Plans New Research Laboratory

A new $8 million building for General Electric Co.'s research laboratory will be erected near Schenectady, N. Y., with construction beginning as soon as War Production Board approval can be obtained.

The company has a much expanded postwar program which will increase the research staff from its present 540 to 800.

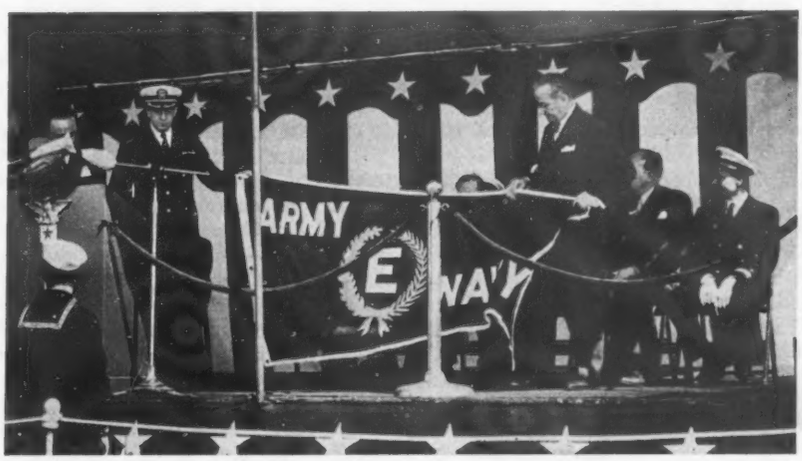
The new building, to be located in suburban Niskayuna, will provide 50 per cent more space than present research facilities afford. The structure will vary from two to five stories in height and will include 200,000 square feet of laboratory working space in addition to a 300-seat auditorium, a dining room, and conference rooms. One-third of the laboratory space will be devoted to service facilities, machine shops and specialty shops, such as glass blowers.

Walls between rooms will be movable, capable of being placed at 18-inch intervals so that rooms may easily be made large or small as desired. Benches and all furnishings will be standardized so that they can be shifted easily as need arises. The building will be air-conditioned. Wires and pipes carrying various kinds and voltages of electricity, compressed air, suction, illuminating gas, hydrogen, and oxygen will interlace the building so that they can be brought into any room.

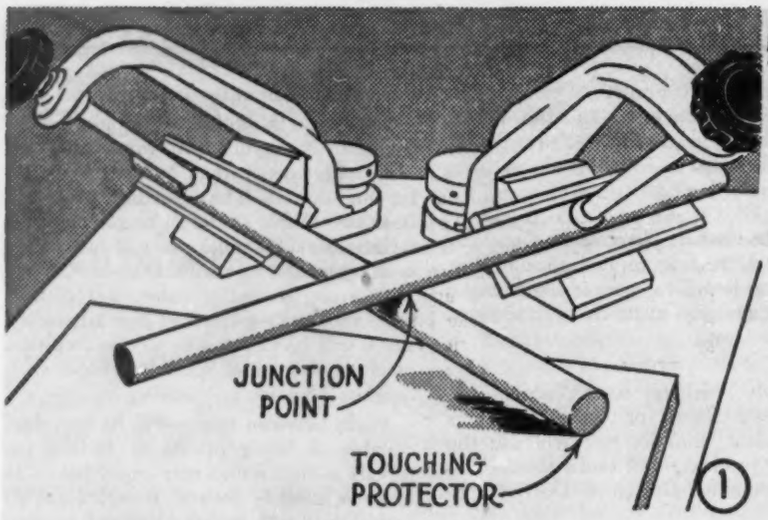
Prosser Company Observes Hundredth Anniversary

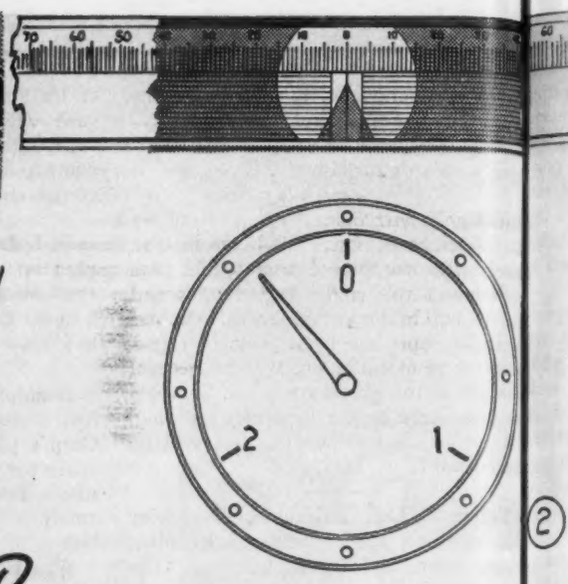
Thomas & Prosser & Son, New York, pioneers in fine steel products and mechanical specialties, are observing the hundredth anniversary of the founding of their firm by Thomas Prosser, great grandfather of Roger D. Prosser, present head of the company.

The firm has been controlled throughout the 100 years by members of the same family. Continuously for 92 years the company occupied offices in the same building. During a portion of this time, members of the family owned that building. The company is located now at 120 Wall street, and is one of the oldest firms in the downtown business district of New York.



WINS AWARD: Army-Navy E flag awarded Pilgrim Drawn Steel Co., Plymouth, Mich. Presentation was made by Capt. Robert Velz for the Navy Department, and accepted on behalf of company employes and management by R. E. Lawlor, vice president and general manager





How White Motor Company CHECKS STEEL

Metallurgy department uses low-power thermocouple system for checking incoming steel and material in inventory against master samples

HALFWAY down the length of a bay at the plant of White Motor Co., Cleveland, in a section housing the automatic screw machine department, stands a box-like piece of equipment mounting two large clamps on its top surface and having a slanting, easily read instrument panel. This instrument, known as the Identometer, makes rapid, positive tests to check incoming steel against specifications by comparing against a standard. It also is used effectively to make comparison tests of steel already on hand but believed to be improperly classified.

Flanking the instrument, and extending from it on either side down the length of the room, are the stock racks of steel bars which range in size from ⅛-in. in diameter up to 3 in. and larger, mainly hexes and rounds. Analyses range from mild steel (SAE 1010 to 1020) to high alloys, even including 5 per cent nickel. Before the bar of any one lot is taken from inventory, at least one test of that lot has been made. This is in addition to the original check on mill shipments.

Although the testing instrument is located in a production department, it is in reality an "electrical partner" of the metallurgy department at White. Within recent months, there have been numerous occasions when it proved its value beyond question. Shipments of steel bars have reached company's receiving platform at times mislabeled as to chemical analysis and at times tagged with performance characteristics they do not possess. If certain heat treating procedures specifically intended for other materials are applied, disaster can ensue.

It has been common practice to have the laboratory check one bar out of each 1000 lb of new stock for chemical analysis, although this varies depending upon the size and quality, but laboratory tests of necessity are detailed and time-consuming. Furthermore, there is a shortage of trained technicians, so that the exhaustive requirements of "proving out" by this means shipment after shipment, covering a large share of the SAE range of specifications, becomes a burden. Without instruments capable of making comparisons, and without standards set up by such comparisons, there is much duplication of effort over any given period.

According to E. H. Collander, metallurgist in charge of this phase of the work, arrival and installation of the Identometer made a great difference. For example, once the identity and chemical composition of the SAE 4340 type is checked in the laboratory, a sample bar, about 1 ft long, is marked with this series number and, together with a standard index card bearing data on carbon, manganese, chromium, nickel and molybdenum content, is sent to the screw machine department and deposited in a sample or "standards" cabinet which stands beside the testing machine. The bar then is tested, and the instrument's reaction—in millimeters, positive and negative—is noted on the card. This becomes the standard for other bars of the lot in which it was received and for later tests on types of material thought to be of similar analysis. Where chemical analysis formerly was required for 20 bars out of each 10 tons received, use of the instrument can reduce the frequency of chemical sampling to a rate of one bar in 5 or 10,000 lb, and even more, provided the shipment is of one grade or type of steel.

Upon receiving a shipment labeled 4340, testing machine operator takes the 4340 standard bar from his cabinet, looks at the card for the standard indication, and affixes the reference specimen into left-hand screw clamp, shown in sketch, Fig. 1, in a diagonal position and parallel with top of the Identometer. Free end points toward front. Specimen taken from new shipment whose analysis is suspect, or portion of bar which is thought to have been stored in the wrong place, i.e., any unknown item, then is placed in right-hand screw clamp so that it rests across and in contact with upper surface of the known sample.

Next, the two flexible leads from the sides of the instrument each are connected to the corresponding free end of the specimens approximately equal distances from the "junction point", as in Fig. 1. This junction point is the small, solid area of contact, approximately 3/32-in. in diameter, between the specimens. After firm contact has been established, operator uses the flat of his hand to depress the pair of bars until the free end of the bottom one rests upon the fiber protector board in the top of the instrument case. He then makes sure that flexible leads are attached at a minimum distance of 3 in. from the junction point. Next, the power control knob on the front of the machine

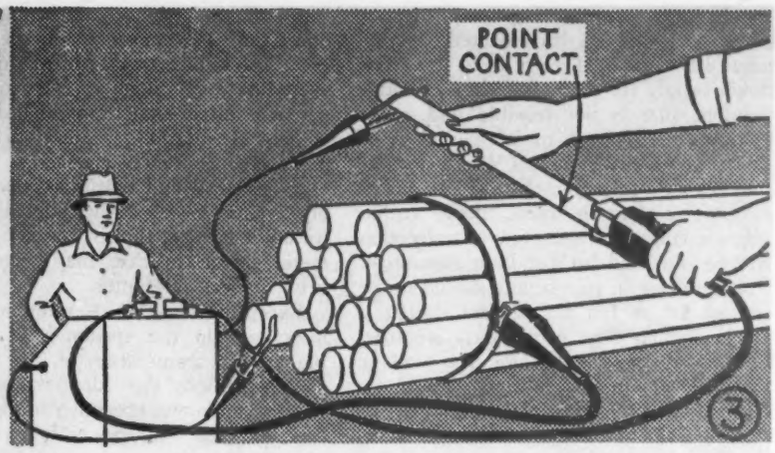


Fig. 1—Setup for testing when both bars are short. Known reference specimen is in left hand screw clamp, unknown at right

Fig. 2—Calibrated scale and timer. Movement of indicator beyond 5 millimeters in either direction from center line denotes dissimilarity in composition

Fig. 3—Diagram of method for testing bundles of bars

By D. B. WILKIN
Associate Editor, STEEL

ANALYSES

is turned to zero. Maximum power setting is at zero; minimum is at 5. He turns a tumbler switch to "on" and the indicator on the calibrated scale in the center of slanting instrument panel lights up.

At the beginning of test, inverted V and hairline of lighted indicator should rest exactly upon the center (zero) calibration of the scale, as shown in diagram, Fig. 2. Usually, after depressing the "operate" button, hairline will not remain on zero. This is due to differences in the temperatures of the specimens as well as possible temperature differences which may exist at the contact of the potentiometer leads. Operator then turns adjustment knob below the scale in direction of the desired correction until hairline returns to center line, or zero.

Basis for operation of the Identometer, first placed in the White plant on an experimental basis 3 years ago by Dravo Corp., Pittsburgh, national distributors for the builder, American Tubular Elevator Co. of that city, is founded on the principle of thermoelectricity. Thus, if two electrical conductors are connected into a circuit so they have a mutual point of contact, and then the temperature of that point of contact either is raised or lowered beyond temperatures of the two remaining junctions, a thermal electromotive force will be obtained if the conductors are dissimilar in chemical composition. No electromotive force will be indicated if conductors are identical in composition. How well this theory works in practice may be judged by the fact the machine now in use at White—a much improved model—is a permanent part of the material scheduling cycle for bolts, nuts, studs, small gear blanks and shafting.

With the exception of lead, all pure metals and their alloys differ in thermoelectric power to a greater or lesser degree. For this reason, certain combinations of new, unlike steels will produce, when tested in this instrument, small indications of their dissimilarity, whereas other combinations will show relatively powerful effects. On the other hand, chemistry of a heat of steel will vary somewhat from point to point throughout each ingot. Inasmuch as samples taken from these points of slightly differing chemical composition will form a low-power thermocouple—even though the pieces are from the same heat or ingot (by reason of the difference in chemical composition), a white field is provided on the calibrated scale of the Identometer throughout which the indicator line may move and yet not denote dissimilarity of analysis. Area enclosed by this white field is tolerance. This was established by several thousand tests with all types of steels, as an average permissible range of movement to accommodate the slight differences in a single heat.

Following adjustment of the hairline to zero on the calibrated scale, and having established the most suitable power control setting for this particular type and size of steel bar by a process of elimination to be explained, operator pushes the timer toggle switch to "on". This starts timer pointer in clockwise motion, making one complete revolution every 3 sec. The timer is provided primarily to insure a consistent duration of testing time, because for a given power setting, a long test duration will raise temperature at junction point more than a short test duration and give distorted indications; also deflection of lighted indicator will vary according to interval of test time.

For most applications, test time interval should be 1 sec. When testing specimens ranging in thickness between 1/16 and 1 in., the 1-sec interval is used; for thicknesses between 1 and 2 in., 2 sec; for stock 2 in. in diameter or larger, 3 to 5 sec is the interval.

In this case, where known specimen is a 4340 bar, approximately ½-in. in diameter, test time is 1 sec. Operator depresses the test button as pointer reaches the "0" mark, and releases it slowly as pointer passes the 1-sec. mark on timer dial. Indicator panel (Fig. 2) is calibrated to 70 in units of 10 on each side of zero center. Proving that both known and unknown specimens correspond closely in chemical content, fluctuation around zero is at first barely perceptible, the ultimate deviation during 1-sec interval being nearly 4 mm, positive. According to Mr. Collander, 5 mm on either side of zero usually is regarded as the limit, or practical tolerance, within which a finding of "same analysis" is acceptable.

In another demonstration, a standard SAE 1020 specimen is removed to the special White fixture which appears in Fig. 4. This useful adjunct was built by the company's tool and die department as a means of preventing spoilage of stock-length bars by cutting test pieces from them. Limited space on top surface of the Identometer necessitates use of short specimens. The setup in this test fixture is identical with that on top of the instrument insofar as junction point, connection of flexible leads, and test indications are concerned. The only difference is in the employment of extension cables leading from the instrument to the fixture and in method of presenting specimens to each other.

In using this fixture, the reference specimen and unknown bar are fastened into the work-holding or adapter plates, as shown in Fig. 4. The short standard bar rests below, at a right angle, but in firm contact with the full length (8 to 12 ft.) specimen. Pressure contact is maintained on the unknown bar by a perpendicular hand screw which comes down through the clamp arm of the stand, and on the standard bar from below by action of a cam (see handle at forward edge of fixture) against the base of a circular plate in the column supporting

the standard specimen. When raised and locked in place, this cam holds immovable the entire assembly of adapter plates and test bars.

For this test on SAE 1020 material, power control knob is reset for a power factor of 3. Experience has shown that a lower power factor for mild steel makes for higher accuracy. Despite the fact that the two bars being tested are different in cross-section, the long bar being much larger, the inverted V barely moves when the operating button is depressed. This indicates beyond a reasonable doubt that the long bar which came from the stock rack was properly stored. Here, again, availability of the conveniently located testing instrument and its use in periodic "sampling" of the stock stored in the screw machine department reduce to a minimum time lost in identifying misplaced bar stock and misuse of material.

Upon the substitution of a bar of high-alloy steel for the stock length 1020 specimen, yet retaining the 1020 reference specimen, the hairline indicator swings instantly into a negative 50 range, thus informing the operator that he has two bars of widely differing content.

Those who use this instrument at White regard details bearing on electrical hookup as essential for proper installation of the Identometer. Power supply on which the instrument depends should have capacity of at least 3.5 kw.; porcelain receptacle is connected to an 8-gage line coming directly from the step-down supply transformer. When an independent line is not feasible and other electrical equipment must operate from the same source, as at White Motor, the low power factor of this instrument may, in certain instances, prove to be objectionable. Power factor correction can be obtained by installing capacitors. Voltage drop on supply line should never exceed 10 or fall below 100 during a test in which 3-in. round bars are used as standard specimens for the voltage drop determination. Fusing should be 35 amp., either cartridge or breaker type. The following facts have been developed through experience:

1. There is little danger of the operator being "shocked" any place on the exterior of the instrument, however, no conducting material should be permitted to come into contact with both clamps or studs when they operate and test buttons are depressed or when an actual test is in process. This will cause severe arcing and may result in damage to clamps or studs.

2. Material to be tested need not be ferromagnetic nor do magnetic specimens have to be demagnetized prior to identification. Testing is equally successful on austenitic types as well as on ferritic alloys.

3. Neighboring magnetic or electrostatic fields, when present, have no effect on the operation of the instrument or the accuracy of results obtained.

At the beginning of each operating day and after each time the instrument is moved, normal position of lighted hairline indicator is checked. If point of inverted V and hairline does not rest on zero center of calibrated scale a cap for adjustment at the rear of the galvanometer, inside the case, may be turned to bring it back on center.

Exceptions to Test: A reference specimen kept in the specimen file in the plant, with temperature of 70° F, when connected into the Identometer circuit with an unknown specimen brought from the receiving platform with temperature of 30° F, will cause noticeable deflection of lighted indicator. This must be disregarded, as it is not the identifying deflection for this combination, no test having been made. This condition is corrected by turning the zero adjustment "arrow" in an opposite polarity to that shown by the false electromotive force of the unequally heated specimens, thus imposing a counter electromotive force which will in no way affect the accuracy of subsequent tests, providing test is made within a few seconds after making such correction.

Fillets, shapes, bars, wire, sheets or samples of any of these of any size may be used for this type of testing. In selecting specimens for testing, equal care should be exercised as in selecting samples for chemical analysis. It is important to obtain a specimen which is most representative of the heat or lot analysis of the steel from which it is taken.

Previous heat treatment sustained by any two specimens under test should be of approximately like order. Most of the steel delivered to this department has been annealed. If it is necessary to identify a specimen which is known to be in a quite different state from the known reference sample, as regards physical structure, the two samples must be equalized by a suitable treatment. The following preparatory treatment has been tried and found suitable:

Both specimens are placed simultaneously in furnace at 1700 to 1899° F and allowed to "soak" until the larger of the two reaches the furnace temperature. They then are removed simultaneously and water or oil quenched. (Although this treatment is metallurgically incorrect for most grades of steel,

(*Please turn to Page* 158)

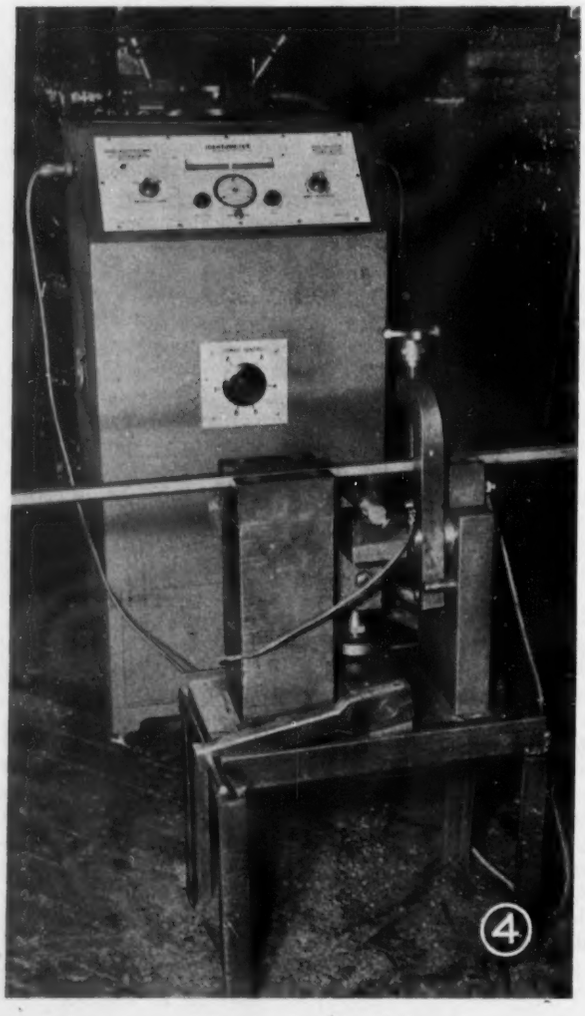
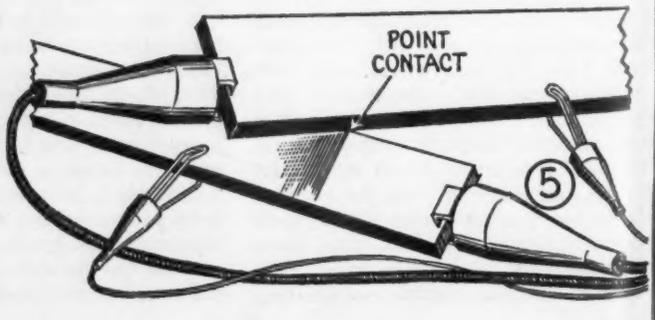


Fig. 4—Special fixture developed at White to avoid cutting up stock lengths for testing. Identometer appears in background

Fig. 5—Method of connecting power cables and potentiometer leads in testing two large flat bars



CONTROLLING QUALITY
By Statistical Methods

By JOSEPH MANUELE
Director
Quality Control
Westinghouse Electric Corp.
Pittsburgh, Pa.

IN RECENT YEARS, there has been a considerable amount of interest in the control of quality of products *during manufacture* as against the older philosophy of making products and subjecting them to rigid inspection *afterward*. There is good business sense behind the policy of controlling quality during manufacturing. It reduces rejects to a minimum; it secures maximum production from available equipment; and it assures lowest unit costs.

In a good many instances, the statistical method of controlling quality is used. The beginner might well confine his applications to methods described in the American War Standards "Z1.1" "Z1.2" issued in 1941, and "Z1.3" issued in 1942 by the American Standards Association.

It is not necessary that the inspector be familiar with the Laws of Probability or the fundamental mathematical concepts involved in order to apply the statistical method to the control of quality. Any shop man knows that if he were to set up an automatic cutoff saw to cut off pieces of 1-in. length from bar stock, the pieces would not all be 1 in. long, and that probably no piece would be exactly 1 in. long. He knows that if he were to measure all of the pieces, then plot a curve showing the number of pieces of any length, he would get a distribution similar to that shown in Fig. 1.

This same distribution will be obtained from observations on any quality whether the products are the result of automatic machine operations, or whether they be the result of hand-assembly operations.

The mathematician knows that if the process is under what he terms statistical control, the frequency distribution curve will have certain characteristics. He knows that 68.26 per cent of all observations will fall within one standard deviation of the mean; he knows that 95.46 per cent of the observations will fall within two standard deviations of the mean; and that 99.74 per cent of the observations will fall within three standard deviations of the mean. This is shown in Fig. 2.

Therefore, if it is desired to adjust a process so that it will produce no rejections, it is necessary that parts coming from such a process be distributed similar to the distribution shown in Fig. 2. Furthermore, it is necessary that this distribution fall within the specification limits.

If we were to take the distribution curve shown in Fig. 1 and rotate it 90 degrees, we would have a curve resembling Fig. 3. If we could arrange to have this curve completely within the drawing or specification limits, then we should expect no rejections from the process.

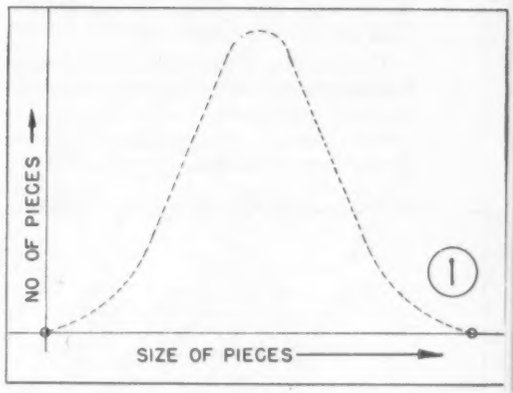
Two features must be noted in Fig. 3. We could have rejections from the process due to one, or both, of two causes: First, if the mean of the process were not near the nominal specification value, we might have parts rejected because of being oversize or undersize, depending in which direction the mean were displaced with reference to the nominal dimension. The second cause for rejections might be due to inability of the process to repeat consistently. This would give a large standard deviation, causing the tails of the curve to fall outside the specification limits.

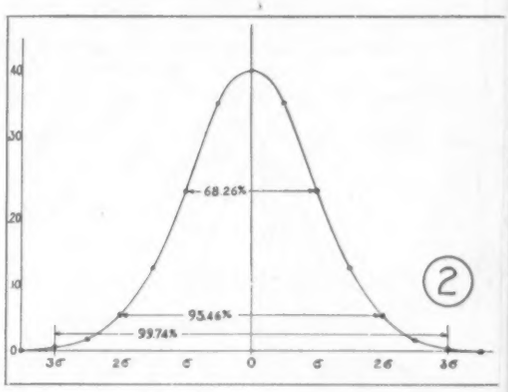
The mean of the process is determined by the setting or adjustment of the process, and is within the skill of the operator to control. The size of the standard deviation, or the length of the base of the curve, is a measure of the ability of the process to repeat consistently. If these two points are kept in mind, it will be easier to locate trouble, when trouble is indicated. A study of Fig. 3 will make this point clear.

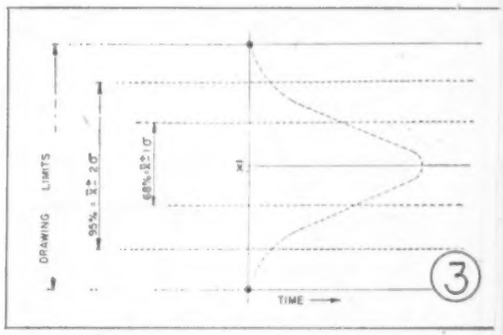
Let us take an automatic screw machine and proceed to set it up for production according to these principles. Let us assume that we are to make a rivet which has a diameter of 0.125 to 0.126-in. The machine setter will proceed to set up the machine in the conventional manner. When he is satisfied that the machine is producing properly, he calls the inspector who proceeds to check the setup according to statistical control methods.

The inspector takes a sample of 50 pieces and measures and records the diameter of each piece. He then calculates the mean and the standard deviation for these 50 pieces. The data and calculations are shown in Fig. 4. It will be noted that the mean is 0.1245-in. and the standard deviation is 0.000495-in.

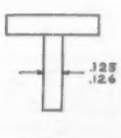
From this information, he charts the







NO.	"X"	"x-X̄"	d² x10⁻⁶
1	.1248	+0003	9
2	.1251	+0006	36
3	.1245	.0000	0
	.1252	+0007	49
		-0005	50
46	.124-		
47	.1248	+0003	
48	.1248	+0003	9
49	.1244	-0001	1
50	.1249	+0004	16
Σ X=	6.2250	Σ d²=	1228x10⁻⁶



AVERAGE = $\bar{X} = \frac{6.2250}{50} = .1245$

STANDARD DEVIATION = $\sigma = \sqrt{\frac{1228 \times 10^{-6}}{50}} = .000495$

4

Fig. 1—Typical distribution curve. All data and illustrations used here are from an ASME report

Fig. 2—Normal curve of experience

Fig. 3—Elements of control curve, with limits

Fig. 4—Mean and standard deviation calculations for first machine setting

frequency distribution curve shown in Fig. 5. It will be noted that a very small percentage of the parts fall within the drawing limits. A study of this curve shows that the machine needs to be reset, to bring the average of the process nearer the mid-point of the drawing limits. It also shows that the process is not repeating with sufficient consistency and, therefore, the spread of the distribution is much wider than the spread allowed by the drawing limits. *This means that the tools should be resharpened.*

The machine setter is advised of these conditions and, after he has made the required corrections, the inspector takes a second sample; this time only 20 pieces. From these 20 pieces, he calculates the mean and the standard deviation as previously. It will be noted now that the mean is 0.1250-in., and the standard deviation is 0.000127-in. The data and calculations are shown in Fig. 8

He then constructs a frequency distribution curve based on these values, which are shown in Fig. 6. It will be noted that 50 per cent of the parts are undersize. The machine must be adjusted further to bring the average of the process nearer the mid-point of the drawing limits. It is also noted that the standard deviation is still too large.

The machine setter proceeds to reset the machine, and he also attempts to dress up the cutting tools, in an effort to achieve greater uniformity of product.

The inspector takes another sample, this time taking only 10 pieces. It might be stated, parenthetically, that a sample of 10 pieces is too small under ordinary conditions. We have found that to determine the approximate distribution of a process, we must have a sample of 25 to 50 pieces. A larger sample, of course, is more informative, but a sample less than 25 pieces must be looked upon with suspicion.

The data and calculations from a sample of 10 pieces are shown in Fig. 9. It will be noted that the mean is now 0.1255-in., and the standard deviation is 0.000268-in. The frequency distribution, based on these values, is shown in Fig. 7. The machine is now set at the correct point for the production of a minimum amount of rejections. However, the standard deviation is too large. A few pieces will be produced which will be oversize, as shown by the shaded area at the right. A somewhat larger percentage of parts will be produced, which will be undersize, as shown by the shaded area at the left of Fig. 7.

We now have two alternatives. We can take the tools out and attempt to dress them up to improve the keenness of the edge, in an attempt to achieve greater uniformity of product. The second alternative is to allow the operation to run and to pick out later the defective parts by detail inspection. From the experience we have gained in setting up this machine three times, it appears that the cutting tools cannot be improved.

There is probably something inherent in the machine which produces this lack of uniformity. This might be loose bearings, excessive vibration, lack of uniformity in the bar stock, or any other of a number of factors. However, it appears that we have adjusted this particular operation about as well as we can under the circumstances. Further improvement requires an inspection of the machine itself, to determine the cause of the wide variability between parts.

The idea appears to be prevalent that when we speak of control of quality during manufacture, statistical methods are always implied. This is not the case. We have been able to control quality at Westinghouse without using statistics. It must be borne in mind that the statistical method, while desirable, is a rather expensive tool, requiring trained personnel. It also is rather difficult to explain to people who do not possess the proper mathematical background. However, the fundamentals of this method can be retained, if we are willing to operate with very small samples—say samples of one piece. Then the method resolves itself into "first piece and patrol inspection."

When quality of product is being controlled by means of "first piece and patrol inspection," the machine, or process, is set up and adjusted in the conventional manner. After a sufficient number of pieces have been produced to give assurance that machine operating conditions have reached stability, the operator informs the inspector, who performs the "first piece inspection."

This method applies to machining operations on parts as well as assembly operations on the completed equipment or on subassemblies.

The inspector proceeds to make a com-

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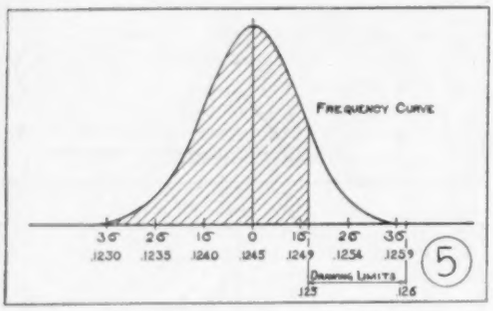
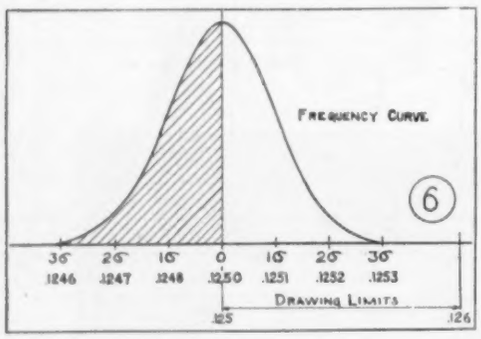




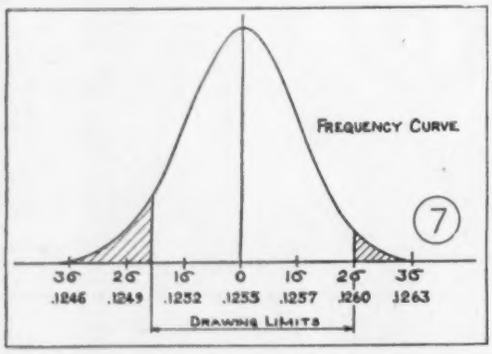


Fig. 5—Frequency distribution curve charted from data in Fig. 4

Fig. 6 — Frequency distribution curve charted from data in Fig. 8. Note that 50 per cent of the parts are undersize

Fig. 7.—Frequency distribution curve from data in Fig. 9 shows machine is now set at correct point for producing minimum rejections

Fig. 8—Mean and standard deviation calculations for second machine setting

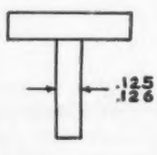
Fig. 9—Deviation calculations for third machine setting show mean is now 0.1255-in. and standard deviation is 0.000268-in.

NO.	"X"	$x = X - \bar{X}$	$d^2 \times 10^{-8}$
1	.1250	.0000	0
2	.1250	.0000	0
3	.1249	-.0001	1
4	.1250	.0000	0
		-.0001	1
16	.12[illegible]		
17	.1252	+.0002	
18	.1248	-.0002	4
19	.1251	+.0001	1
20	.1251	+.0001	1
ΣX =	25004	$\Sigma d^2 =$	32×10^{-8}

AVERAGE $= \bar{X} = \frac{25004}{20} = .1250$ (8)

STANDARD DEVIATION $= \sigma = \sqrt{\frac{32 \times 10^{-8}}{20}} = .000127$

NO.	"X"	$x = X - \bar{X}$	$d^2 \times 10^{-8}$
1	.1255	.0000	0×10^{-8}
2	.1256	+.0001	1×10^{-8}
3	.1255	.0000	0×10^{-8}
4	.1255	.0000	0×10^{-8}
5	.1255	.0000	0×10^{-8}
6	.1255	.0000	0×10^{-8}
7	.1254	-.0001	1×10^{-8}
8	.1254	-.0001	1×10^{-8}
9	.1255	.0000	0×10^{-8}
10	.1257	+.0002	4×10^{-8}
ΣX =	1.2551	$\Sigma d^2 =$	7×10^{-8}



AVERAGE $= \bar{X} = \frac{12551}{10} = .1255$ (9)

STANDARD DEVIATION $= \sqrt{\frac{7 \times 10^{-8}}{10}} = .00026$

Development and Future of RESISTANCE WELDING

Research has smoothed the course so that procedures now follow known laws. "Off the shelf" equipment affords pressure ranges from as little as 3 ounces to 300,000 pounds. Power load problem solved

By H. C. COGAN
Chief Engineer
National Electric Welding Machines Co.
Bay City, Mich.

RECENT developments in resistance welding have given unexpected impetus to its adoption in many industries and to new uses in the fabrication and assembly of an imposing number and variety of products. They range from tiny wire assemblies, such as the filament of an electronic tube, to heavy items like rail sections and truck axles; complete bodies, comprising subassemblies for trucks, trailers, tanks, railway cars, and even large ships.

These products, running the gamut of prewar, wartime and postwar requirements, include uses in the high production, low cost fields of manufacture, as well as in precision and closely controlled techniques such as the manufacture and assembly of aircraft.

Even many of those now extensively using spot, seam, butt, or flash welding are not fully aware of the great progress that has been made in new applications of resistance welding or of the exhaustive scientific study and experimental work that has been devoted to broadening its field of usefulness.

As with most new processes, discoveries are closely guarded. Hence, little technical data finds its way into print except that which relates to those processes which have been in use for some time and, therefore, may have been superseded; or to developments involving startlingly new principles or devices which may in the future be put to practical use.

Summarizing these not yet widely known developments in resistance welding, they may be classified under five major categories, according to conditions or objectives, as follows:

1. A new way to resistance weld a product by change in its design or by application of a different form of resistance weld more suitable to the design.
2. By special control and operating sequence of the welding machine or by the design and construction of a new or special equipment involving a particular sequence of time, temperature and pressure control.
3. By general improvement of the standard line of resistance welding equipment and control, especially by increasing the range of equipment available.
4. By the application of suitable jigs, fixtures and tooling to increase the application of resistance welding and further reduce per unit cost.
5. By the increased research being done by the American Welding Society, Resistance Welder Manufacturers' Association and several outstanding educational institutions, resulting in a great contribution through the activities of many committees and researchers in the theory and technique of resistance welding.

Developments Arising from Change of Method: Excepting certain refinements of procedure, making a resistance weld today is pretty much the same as in the past. Recently developed methods have not changed the basic technique but have greatly improved the process and have brought about the design of equipment capable of producing better welds, faster and at much less cost for power and labor. These improved methods are being applied to a steadily increasing number of metals, beginning with aluminum and aluminum alloys, and running through the low-carbon steel groups and on up to and including stainless and the high alloy steels, with carbon content up to 80 per cent, as well as NE steels.

A resistance weld has been defined tersely as the result of "heat and squeeze", and in truth, it is. New methods of applying the "heat and squeeze" have been developed to heat and upset a bar or flat piece. Properly controlled, a standard resistance butt welder, or one that is practically standard, can be used for the upsetting operation. The industry is looking forward to some interesting results from this application. Hot upsetting of rivets and studs, and heating for subsequent forging operations are recent developments in the field of resistance welding or, more properly termed, resistance heating field. See STEEL, April 17, 1944, p. 94; and Feb. 19, 1945, p. 106.

In recent years, the newer methods used for laboratory testing of all types of resistance welds have been developed to as high a degree of standardization as testing methods of any joint or structural shape and of other materials or methods of fabrication. While a great deal of knowledge constantly is being gained from physical or destructive type tests, the so-called nondestructive test of a resistance weld has many obvious advantages.

Standard practices have been established for testing aluminum spot welds and steel flash welds. When war restrictions are removed, practical electronic equipment doubtless will be available for all users for nondestructive testing. Such equipment, together with the magnetic oscillograph and the ampere squared-second (weld) recorder, automatic current and voltage compensation, will provide absolute control of physical characteristics and appearance of any type of resistance weld, assuring the designer and builder of production welded parts of the highest degree of performance at minimum cost per unit.

Recent Developments Resulting from Special Controls: Prominent among these are the spot welding of hardenable, high alloy and carbon steels through temperature control available for existing equipment, and fully automatic operating cycle or program control providing preheat, weld and post-heat control, as well as pressure variations during heating, welding and annealing cycles.

Increased application of series capacitors and stored energy equipment now permit installations of heavy duty resistance welding equipment where large capacity power systems were either already overloaded or did not exist. New voltage and current compensation devices, such as power factor correction,

(*Please turn to Page* 172)

"Mousetrap" Firing D

. . . made from stampings and assembled in special jigs

AN UNUSUAL device is pictured in Fig. 3 in various stages of completion along with the parts that go to make up the assembly. This unit when completed forms the heart of a "booby" trap. Its use is almost without limit as it is fired simply by releasing the cover, which allows the trigger to strike the primer, in turn setting off as large a block of explosive as may be desired. Unit can be set to explode upon removing any article which has been placed upon it.

As shown in Fig. 3, the device is made almost entirely from stampings. Several features in their production warrant description. For example, the box itself, upper right, is made at Geometric Stamping Co., Cleveland, in a Henry Wright press by means of a progressive die which produces the finished box in five operations that follow each other in rapid sequence. Material is fed into the dies in strip form and comes from the press as the completed 5-sided box shown.

The cover is made from a steel stamping and a small strip of spring copper which is used to help clamp the safety pin in place until unit is ready to fire. Then the safety pin is removed. In stamping out the cover, a projection is raised on it at the point where the spring is to be attached. Then the spring with a hole punched in it at point of attachment is slipped over this projection. With the spring held tightly against the cover the projection is flattened out, "riveting" the spring in place in a simple press operation and without the need for handling and inserting an actual rivet.

After the parts have been blanked, formed and made ready for assembling, they go to the assembly line where jigs and fixtures designed by Geometric engineers are employed to facilitate assembly.

First operation is to assemble the trigger, trigger spring and trigger hinge pin. The parts are placed in sections of the combination cabinet shown at left in Fig. 1. This container is fitted with hoppers and delivery chutes to feed parts to four assembly stations, two on each side of the bench. Spring is preloaded to a certain tension when making this assembly. As soon as the assembly is completed, the operators drop the unit through an opening in the wall of the container as operator is doing at extreme left, Fig. 1.

From this point, the assembly falls down another chute which delivers it out the end of the hopper-container to the operators who attach the lid and lid hinge pin. Two workers, one at each side of the table handle this operation. Assemblies then are placed in shallow trays and passed along the table to the next operation. Note that in making illustration, Fig. 1, the second and third operators on the near side of the bench are not shown at their stations in order to reveal the parts and setup employed. Also not shown in Fig. 1 is another or sixth operator working on the back side of the hopper-container.

Third assembly operation is spinning the ends of the two hinge pins—one holding the trigger, the other the cover. This is done on the machine shown at extreme left in Fig. 2. Two operators work identical machines on each side of the bench, the first machine being hidden from view by the second. After upsetting the hinge pins, the operators drop

Device

or shove the assemblies into chutes which deliver them down the table to the right in Fig. 2 for the next or fourth operation.

Meanwhile, at the other end of the room, there are eight stations for making up the cord and safety pin assembly. As shown at extreme left center, Fig. 3, this consists of the safety pin itself, notched to engage box sides for further insurance against accidental removal, and the cord with a small cotter pin at the opposite end. Safety pin and cord assemblies on racks are brought to the fourth assembly station at the right in Fig. 2. Here special fixtures are employed at two stations, one each side of the bench. Then the trigger is set, the cover closed and the safety pin inserted.

Final operation is to inspect the assembly, wind the cord around it and insert the small cotter pin in the extended end of the safety pin, providing positive assurance against accidental removal of the safety pin.

Finished assemblies are packed four to a carton. Each carton also contains four primer base assemblies complete with protective cap. Primers are not assembled into the firing device until ready for use. For shipping, the four primer assemblies are inserted in holes in a small block of Masonite. The four primers and four firing devices make a tight package.

Fig. 1—Operator at left is inserting box with trigger assembled into combination feed and chute. Note how bins in unit feed parts out for assembly. Units fall down chute to table at right for further operations

Fig. 2—Operator at extreme left is spinning ends of hinge pins to lock them in place. Units then slide down chute to table stations where operators set trigger and insert safety pins. Last station at right is for inspection, winding up cord and inserting cotter pin in safety

Fig. 3—Upper right, box with large hole threaded to take primer assembly; top center, box with trigger and spring assembled; top left, complete unit; left foreground, primer parts with safety pin and cord; center foreground, trigger with pin and spring; right foreground, cover and complete primer assembly

CORROSION PREVENTIVES

THERE are many methods of preventing corrosion. Among these are plating, painting, oxide or phosphate coatings, porcelain enameling, and the type of easily removable coatings which this discussion will cover. The latter generally are oils, greases and solvent mixtures. They are referred to as "temporary coatings" because they usually are removed before placing parts in operation. Their protective qualities may be equal or superior to permanent coatings during their applied life.

The first fundamental to be considered in preventing corrosion is the condition of the surface over which the preventive material is to be applied. When painting or metal plating, the need for cleanliness has been universally proved and recognized. However, in the field of temporary protection with the oil or grease types of preservative compounds, this vital need has not been sufficiently stressed. In most cases, corrosion preventives are rendered practically useless by applying them to dirty surfaces. Therefore, it is of the utmost importance to select an adequate method of cleaning, and then to employ it conscientiously.

Types of Removable Coatings: The various types of removable coatings in general use may be classified as follows:

(1) **Solvent Types** usually composed of petroleum solvents containing the amount of solids necessary for the desired film thickness. In some cases, chlorinated solvents are used to eliminate fire hazards. The solids may or may not contain inhibitors.

All solvent types dry or set by evaporation of the solvent. Films formed are fairly thin, usually not exceeding 0.003 or 0.004-in. Application may be by spray, brush or dip at room temperature.

Wax type films range from hard and dry to soft and slightly tacky when set. Removal usually is easy.

Asphalt films include both dry and slightly tacky types. They are more difficult to remove than most others.

Solvent-grease films always are soft and offer no difficulties in removal.

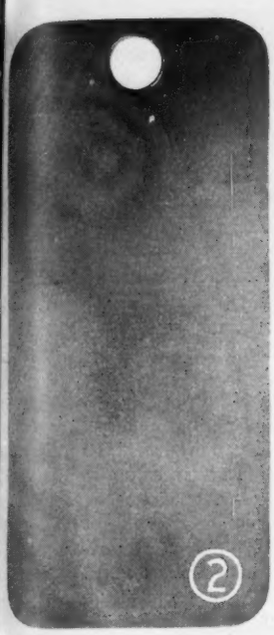
Oil types are both fluid and nonfluid, or adhesive. Their removal, in most cases, is the easiest of all solvent types.

Grease films usually are hard and dry, and the most difficult to remove. They often are used where removal is not necessary.

(2) **Grease** or petroleum type preventives probably are the oldest type in use, and today, improved by inhibitors, are still among the best in protection characteristics. Many men who served in World War I will remember the job of removing Cosmolene from rifles. Removal is not difficult, but it is time-consuming and varies directly with the melting point of the compound. Coatings usually are thicker than other types—0.005 to 0.050-in. They always are applied hot, by spraying, brushing or dipping. They set on cooling and, depending upon the melting point, range in consistency from very soft to hard, waxy films. Grease-type films are the most fragile of the rust preventives and, in most cases, have poor abrasion resistance.

(3) **Oil-Type** preventives almost exclusively are made with petroleum oils of various viscosities, containing one or more inhibitors. They can be subdivided into straight-preservative and combination lubricant-and-preservative types. It is difficult to make a type of preservative which also must have lubrication qualities; in most cases, the two properties are compromised to obtain characteristics favorable to both requirements.

Oil types do not set, but remain liquid and attain their film thickness by draining. Film thickness rarely is as much



A wide variety of materials are available for preventing the deterioration of metal surfaces. Types of coatings, including neutralizers and inhibitors, and their functions and applications are discussed in this study

By J. R. C. BOYER
Metal Research Department, E. F. Houghton & Co.
Philadelphia

as 0.001-in. Application is not a problem, as parts can be sprayed, brushed, dipped or slushed at room temperature or below.

Protection offered by oil types usually is less than most other types, largely because film thickness is initially low and constantly decreases due to drainage. Parts may be protected further by packaging for outdoor exposure. Oil types offer the least difficulty in removal, and often need not be removed before use.

(4) One example of a water-soluble preservative is the emulsified grease type. It is applied in emulsion form at elevated temperatures by dipping. Film set is attained by evaporation of water from the surface. It is slightly tacky and must be removed with solvent.

Protection varies with film thickness, which is controlled by the amount of dilution. Advantages of this type over the solvent type of preventive include low cost and freedom from fire and toxicity hazards.

(5) **Plastic Stripping** type compounds are composed of oils, resins, plastics, inhibitors and plasticizers resulting in fairly hard, nonbrittle materials, somewhat resembling wax. An ethyl-cellulose type of stripping compound, applied hot by dipping, is shown being slit and stripped from a metal shaft in Fig. 1. These compounds are applied by dipping parts in the melted compound at temperatures of 325 to 375° F. Film thicknesses average 0.008-in. Set is attained by cooling. The coating is removed easily by slitting and peeling, as it does not adhere to metal surfaces.

Used coatings may be remelted if there is provision for heating at the point of removal.

Cold-dip compounds of the plastic type still are in the development stage. The film formed is similar to, but thinner than the hot dip, but requires much longer time to set. Essentially, they are solvent dilutions of the hot dip compounds. The solvent must be evaporated at normal or elevated temperatures before the coating is sufficiently set to handle.

Both chemical and physical protection is offered by the plastic coatings, and substantial labor savings are effected over other methods of packaging. Their use at present is limited to relatively simple parts that permit ease in stripping.

Fingerprint Neutralizers: A subdivision of the solvent-oil type, known as fingerprint neutralizers, deserves special mention. This type of product has two

properties in addition to being rust preventive: Neutralizing fingerprints, as their name implies, and displacing water or aqueous solutions from wet metal surfaces. Fingerprints are removed by dual solvent action. The inorganic salt residue is dissolved by water present in the compound, and the oil, grease and organic portion is dissolved by the petroleum solvent. Effectiveness of this type of compound is shown in Fig. 2, in which three panels were fingerprinted with synthetic perspiration. After drying, the left hand panel was slushed with solvent, the center panel half submerged in finger print neutralizer, and the right panel completely submerged. Rusting occurred at end of a week in the panel at left.

Removal of perspiration residues is a very important part of cleaning. It should always follow either liquid or vapor solvent cleaning operations because neither petroleum nor chlorinated solvents are effective in removing fingerprints. The light oil film that is left after the evaporation of the solvent measures about 0.0003-in., and it need not be removed before the application of the final rust preventive.

Army Service Forces Manual M-406 prescribes the use of this type of compound and describes its application.

The water displacing action of this compound is due to its high surface activity. This means that it is able to wet metal surfaces rapidly and preferentially to water or aqueous solutions of grinding and cutting coolants, etc. For example, parts that have just come from a rinsing operation, covered with water, can be slushed in this type compound with no danger of rusting. On smooth surfaces the drops of water can be seen running off rapidly. This water is not absorbed by the compound but falls to the bottom of the tank and can be drawn off. A great many manufacturers of highly finished parts and assemblies have found distinct advantages in this type of compound.

Inhibitors: Reference has been made previously to the term inhibitor. In connection with rust preventives this refers to chemical compounds added to the product, usually in small percentages, to restrain or prohibit the action of corrosion. Other compounds, generally called additive agents or additives, are used to increase adhesiveness, flexibility and expansion and contraction characteristics, as well as to decrease reticulation, thickening and brittleness properties.

Fig. 3 shows the advantage of using additive materials to increase adhesion. Melting point of the grease was the same for each of these panels. The left panel is coated with untreated grease, and the right panel with specially treated compound. Both were heated at 140°F for 1 hr, after which the treated grease kept a firm adhesion. This is a good example of exceeding specification requirements.

Compounds used as inhibitors range from simple inorganic chemicals to complex organic compounds. Examples are the chromates and nitrates, metallic soaps, petroleum sulphonates and organic condensation products.

The tendency to crack under accelerated ultra violet light test is shown in Fig. 4, which represents panels for one month. Both slides were coated with products approved under AXS-673. The one at left is checked and cracked to a much greater degree than the other.

The objects of a treatment, whether it is actually an inhibitive type or an additive for a special purpose, may be summed up as follows:

(1) To increase wetting speed of the finished product.

(2) To inhibit oxidation of the film which in itself would increase the danger of corrosion.

(3) To increase film strength of the product.

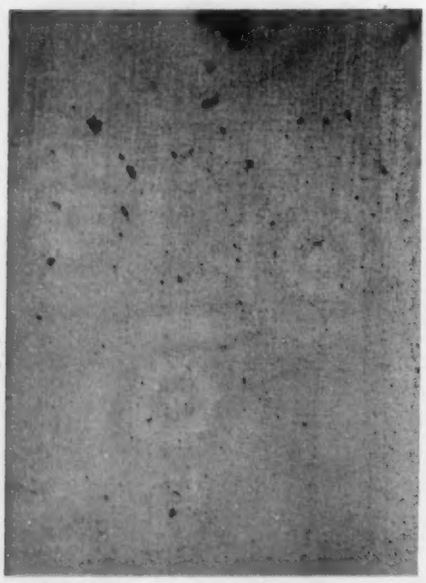
(4) To increase adhesion characteristics.

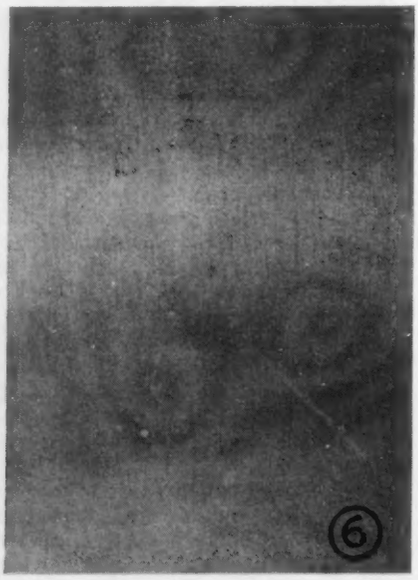
(5) To enhance lubricating qualities where required.

Returning to the term inhibitor, as correctly used, there are several theories as to just how inhibitors perform their function. Proponents of the surface activity theory hold that a continuous unbroken film results from thorough wetting of the metal surface, due to the increase in surface activity caused by the inhibitor. Some authorities believe that inhibitors cause passivity of the surface contacted, providing protection as long as contact is maintained. Still others believe in the polar theory, which is based upon the inhibitor creating an electronegative charge in the compound. The attraction by the electropositive metal ions causes tight adherence, keeping out moisture and other corrosive elements.

It is the writer's belief that the sealing off of the metal by a tight film of a compound which is itself neutral serves to bar oxygen from uniting with iron. Thus no corrosion can take place until that film is broken. There is reason to doubt that the inhibitor permanently renders the metal surface passive. We know that when rust preventive is removed, rust can immediately start to form, which seems to prove that protection is adequate only when the entire metal surface is tightly sealed.

Regardless of how the inhibitor functions, it plays a very important part in the performance or life of a rust pre-





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The plates on this truss are made from Carpenter Stainless #6 (Type 430) Strip supplied with our standard ABC finish. All that was necessary to secure a bright and gleaming surface was to blank and tumble these parts. Previously made from nickel plated non-ferrous metal they had to be blanked, polished, plated, final polished and buffed. Now instead of finishing each piece separately, job lots can be tumbled at one time, thus affording substantial savings in time and expense.

By using Carpenter Stainless Strip with a bright finish, you can reduce your finishing operations and cut production costs. In your planning of new or redesigned products investigate Carpenter Stainless Steels. Your nearby Carpenter representative can help you select the stainless and finish that will do the job best. Call him in today.

COSTS CUT 28%
WITH
CARPENTER STAINLESS

On one part finishing time was reduced from 23½ hours to 1 hour and costs were cut 28% per lot. And that's typical of results obtained on this job because a switch was made to soft and ductile Carpenter Stainless No. 6 Strip with our famous ABC finish.

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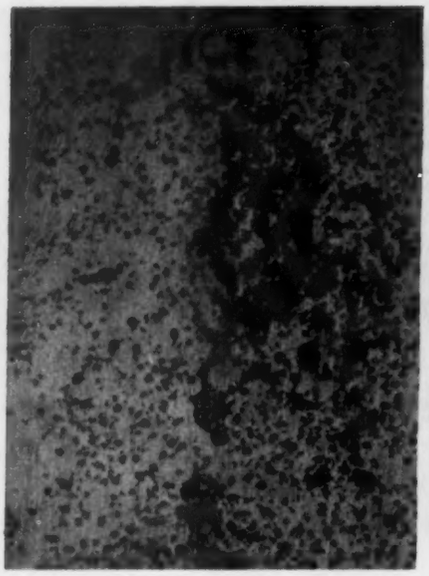

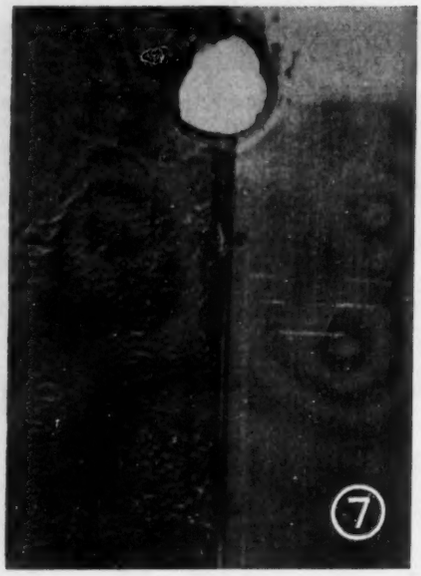

ventive. Figs. 5, 6 and 7 show the practical benefits derived from the use of inhibitors. Fig. 5 is a comparison of the effectiveness of (left) SAE 30 motor oil, and (right) inhibited lubricant-preservative oil of same viscosity after exposure in a humidity cabinet. Fig. 6 shows plates treated with uninhibited (left) and inhibited petroleum after 300-hr humiidty test. Fig. 7 compares the results obtained by using (left) uninhibited and (right) inhibited petrolatum for protection. The latter coating is half removed to show the excellent condition of metal after 6000 hr in a 20 per cent salt spray.

Fig. 8 is a comparison of 20 per cent salt spray protection given by two solvent asphalt type compounds. The panel at left was coated with an uninhibited compound and relied on protection given by the asphalt alone. The one at the right contained additive material not only to increase protection and flexibility, but also to decrease reticulation.

In this same connection it is necessary to stress the importance of the main constituents in rust preventive compounds. There are many types of asphalt, and when they are tested for protection characteristics, vastly different results are obtained. Some types are entirely unsuitable for rust preventive use. This also applies to petrolatums. It is definitely necessary to choose the best type available for the foundation of the product. When inhibitors "take over," they are not required to carry all the load. They have a good start from the foundation ingredient and, therefore, give a "plus value" to the finished product.

GUIDE TO SELECTION

Storage Conditions	Type Coating
1. Outdoor—All Weather Long Term Up to 20 yr	Two-Coat Process 1. Special Type Hard Grease 2. Special Type Solvent Asphalt (Not covered by Government Spec.)
2. Outdoor—Shed Exposure Up to 1 yr	Hard Grease Type Solvent or Water Soluble Grease Solvent Asphalt
3. Overseas Shipment (In conjunction with proper packaging) and long time indoor storage (Without packaging)	Solvent—Wax Solvent—Resin Solvent—Grease Solvent—Asphalt Medium Soft Grease Oil
4. Short-Term Indoor Storage	Oil Solvent—Oil
5. Temporary Indoor (Between operations)	Solvent—Oil (Fingerprint)

In oils, too, there are wide variations that must be considered in building a preventive compound. Source, type and method of refining are all important factors in making the selection. Although they formerly were often used, lubricating oils give very poor protection. It is obvious from both test results and from service performance that it is impossible to produce an oil type preventive without the use of inhibitors. To quote from Army Service Forces Manual M-406, "Ordinary lubricating oil or grease should not be used as a preservative. Straight mineral oil type compounds are not satisfactory."

Protection: Rust preventive compounds vary in physical properties and protection afforded, as shown in panels already presented. It should be helpful at this point to compare the protection expectancy for the different types.

For maximum protection under all conditions of outdoor storage, for periods up to 20 yr, a 2-coat procedure is recommended. The petrolatum or grease type of high melting point, applied by hot dip or brush, is specified for the first coat. After setting, this is followed by a coat of solvent-asphalt type compound; applied by either spray, brush or dip at room temperature. Extended accelerated tests are under way at present with compounds of this type, and it is fully expected that much more than the equivalent expected protection period will be obtained. These are special products, not covered by government specification at present.

For extended protection outdoors, under cover of a shed or roof, a high melting point grease type, solvent or water soluble grease type, solvent-asphalt type, can be used. Preference should be given in the order named. With proper selection, the above types can be used for direct outdoor storage up to one year. Preventives in these two groups are more likely to be required for reconversion or postwar use and selection

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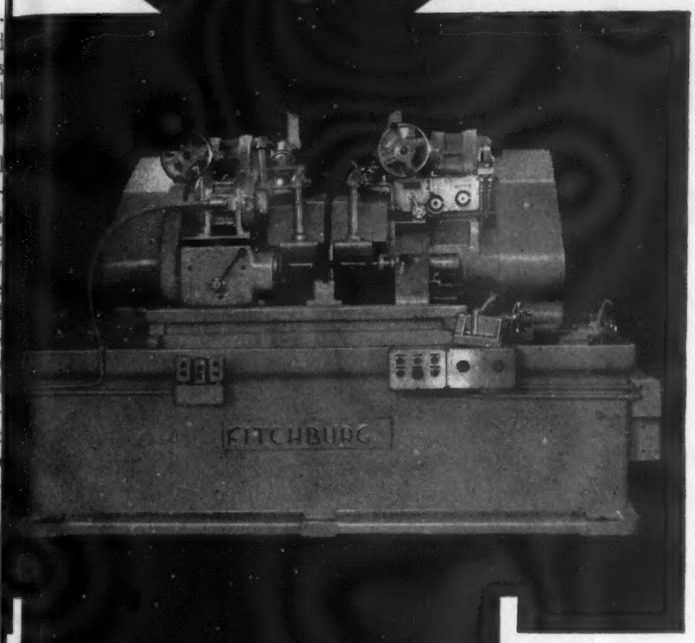

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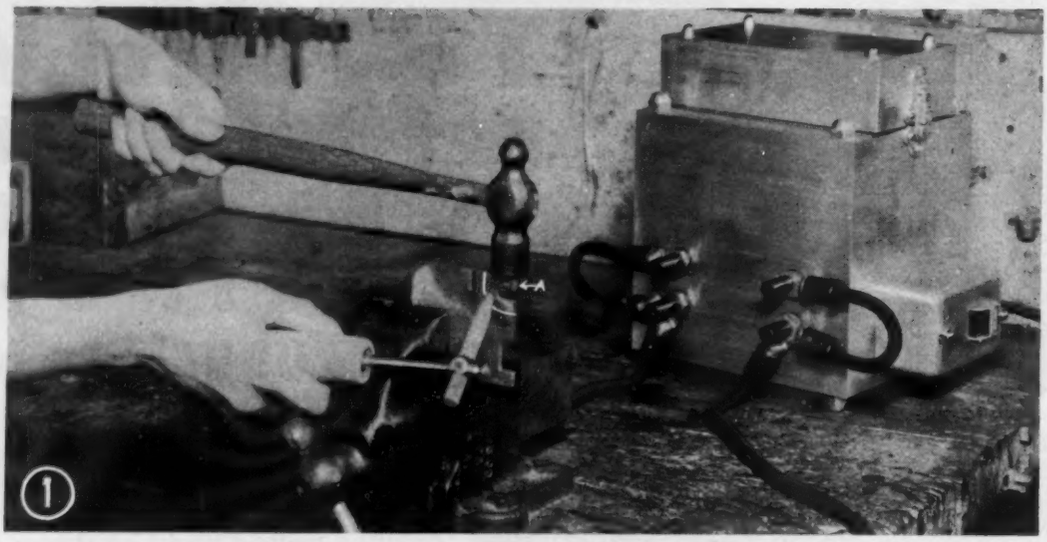


Fig. 1—Electric etching tool used for localized annealing of drill gage

LOCALIZED Annealing and Hardening

Specialized machines for application of heat to certain areas of parts requiring treatment for protection against wear or to help retain or increase softness are described. Employing gas or electricity, these units are remarkably adaptable for production line operations

By JOHN E. HYLER
Peoria, Ill.

LOCALIZED annealing and localized hardening of steel are closely related, especially in that either process presupposes localized heating. Close control of localized heating usually is highly important. In a certain sense, there are some hardening processes which might be considered localized annealing, for softer local areas in steel sometimes are obtained by preventing their hardening during an otherwise all-over hardening operation.

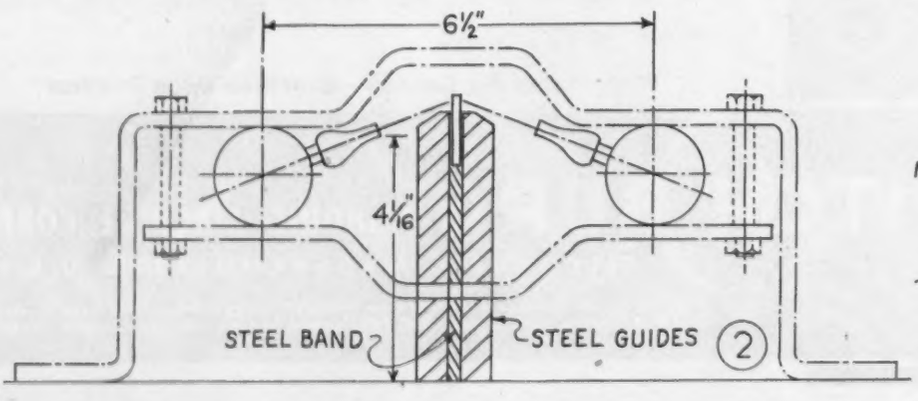
A case in point is the practice of copper-plating given areas to protect them during hardening. The application of this process has been limited considerably because of the necessity for grinding off the copper plate with the resultant loss in time and materials.[1] The process has been made more widely adaptable by coating the area to be hardened with a special stop-off lacquer. The copper plate "takes" only where the lacquer has not been applied.

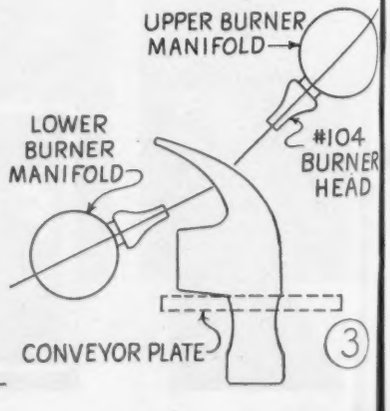
Leaving small portions of parts soft, while the balance is hardened, also has been accomplished by other methods. Hardening of the mass of a 75 mm armor-piercing shot cap, for instance, without heating the last ¼-inch of a thin skirt thereon, has been successfully accomplished by chilling the skirt with water while the body of the part extends into a special, gas-fired, refractory combustion cell held at intense heat for 140 sec. This is done on an unusual 6-line machine which will deliver 150 shot caps per hr.

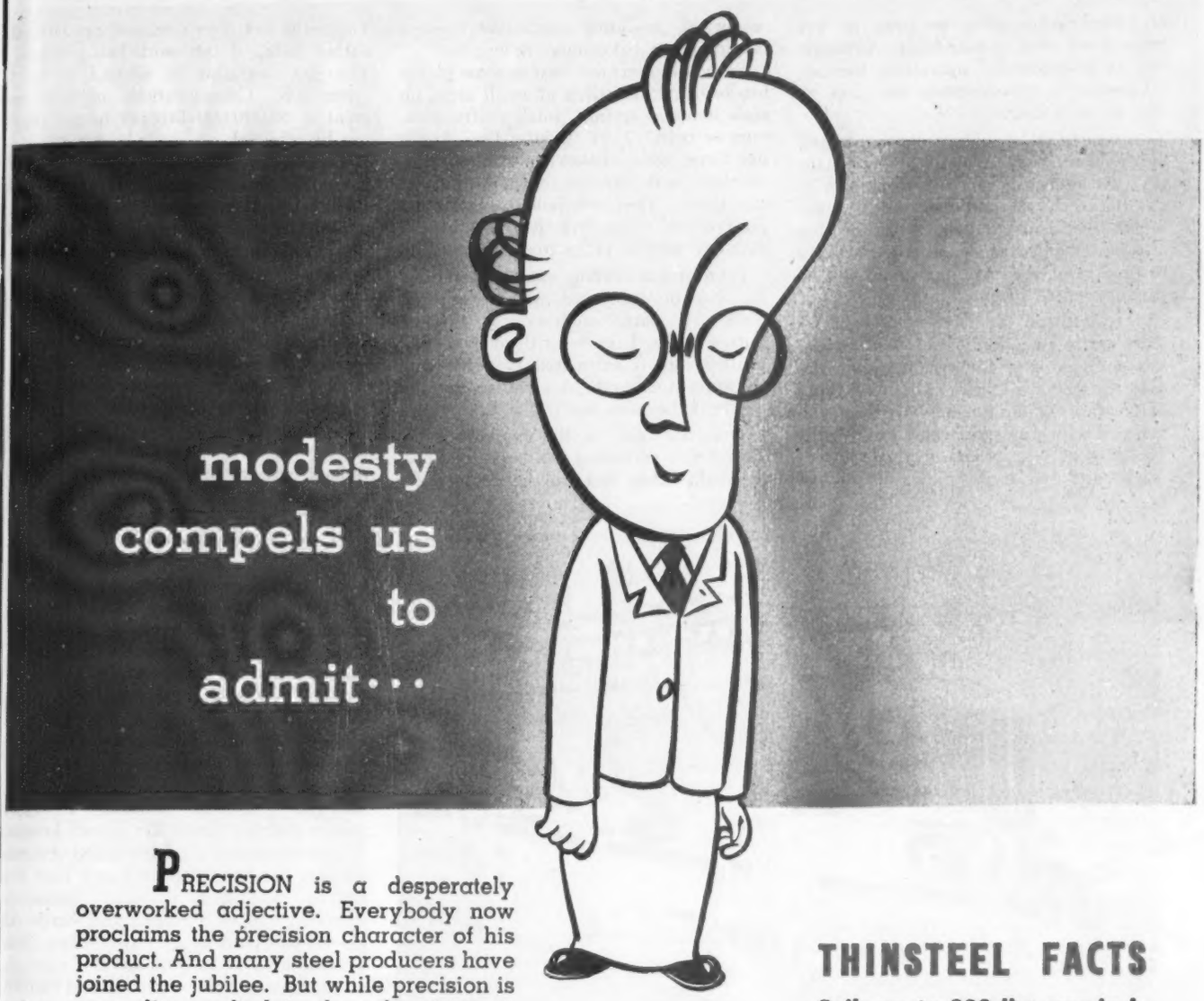
Examples of localized hardening operations are shown in Figs. 2 and 3. In schematic diagram, Fig. 2, hardening is being performed on the toothed edge of hacksaw blades, while the balance of the blade is left unhardened and thus does not become brittle. Manifolds, represented by small circles, are clamped in position to support the burners. They are adjustable with regard to the exact angle at which the burner flames will be projected.

Fig. 3 is schematic setup for localized hardening of hammer claws. Traveling conveyor plates support hammer heads

Fig. 2—Setup for hardening toothed edge of hacksaw blades
Fig. 3—Setup for localized hardening of hammer claws







PRECISION is a desperately overworked adjective. Everybody now proclaims the precision character of his product. And many steel producers have joined the jubilee. But while precision is a quality exalted in the advertising, it sometimes fails to show in the finished steel item.

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in proper relationship to rows of gas burners mounted in manifolds. Although this is a hardening operation, the arrangement is approximately the same as that for annealing.

A variety of machines for hardening and annealing are available. These employ several specialized developments in gas burner heads and machine arrangements. Electrical apparatus for heating also has emerged as an important adjunct to production line operations, and will be discussed here in detail.

Gas Burners: Application of heat for localized annealing by means of special gas burners is a highly important development in this field. Different types of gas-burning equipment have been developed which are applicable both to the handling of odd pieces or small lots of work, and to large production. Blow-pipes sometimes are used where there is only a moderate amount of annealing to be performed, and are available for use with manufactured gas, natural gas, a mixture of the two, or for gases marketed in cylinders, such as butane and propane[3]. In fact, most manufacturers of gas-burning equipment can provide burners suited for any type of gas.

So-called fishtail gas burners have the general contour of a fishtail and are extensively used for localized annealing. They provide an intense heat that can be held and applied in a narrow line. Special machines[3] to which they are applied also are made. Strip steel for razor blades requires annealing down the center, while both edges are left hard. A machine for this purpose employs fishtail burners. The shank of knife blades must be annealed, so they will not be brittle. In some cases, screws are hardened all over and later only the threads are annealed. These operations are performed on similar machines. The burners may be arranged in rows, either straight or curved, providing continuous burners ranging up to 4 ft or more in length.

Ribbon burners are used in some places for localized annealing of small areas on such items as springs, small shafts, rods, nuts or bolts. They throw a thin, knife-like flame, which makes it possible to concentrate heat closely and uniformly at any point. They are held in horizontal position at convenient working height. Standard lengths range from 1¼ to 12 in.

Localized annealing machines employing gas burners, and with means for traversing parts continuously through burner flames have been developed. The heating rate is calculated to agree with the approximate rate at which an operator can feed the parts to a conveyor.

One machine on the market is designed for annealing the ends of brass flashlight tubes, but can be adapted for other duties[3]. Another machine, originally made to anneal the ends of long springs, now is used for similar purposes. A third machine was built for annealing the ends of small steel carbon dioxide bottles, prior to the necking operation. Work is handled in a vertical position, and heating is done by sharp-flame ribbon burners. After passing the burners, the conveyor carries the work-pieces into an enclosed cooling extension, which serves to decelerate the cooling rate, often highly important. Such work tends to cool faster than that which is heated all over, due to the fact heat tends to be drawn off quickly into the unheated portion of the part by conduction.

Ceramic burners allow close control of heat generation and transfer. One unit is of the radiant cup type.[2] At the bottom of the cup is a ceramic plug fitted with radial slots all around, through which completely premixed gas and air is discharged under pressure. Another ceramic gas burner is practically enclosed, except for a slot which serves as a heat outlet. The outlet slot is narrow, and can be held within ¼-in. of the work being heated. The slot can also be shaped to fit a given job. Concentrations of heat as great as 50,000,000 Btu per hr per cu ft can be attained.

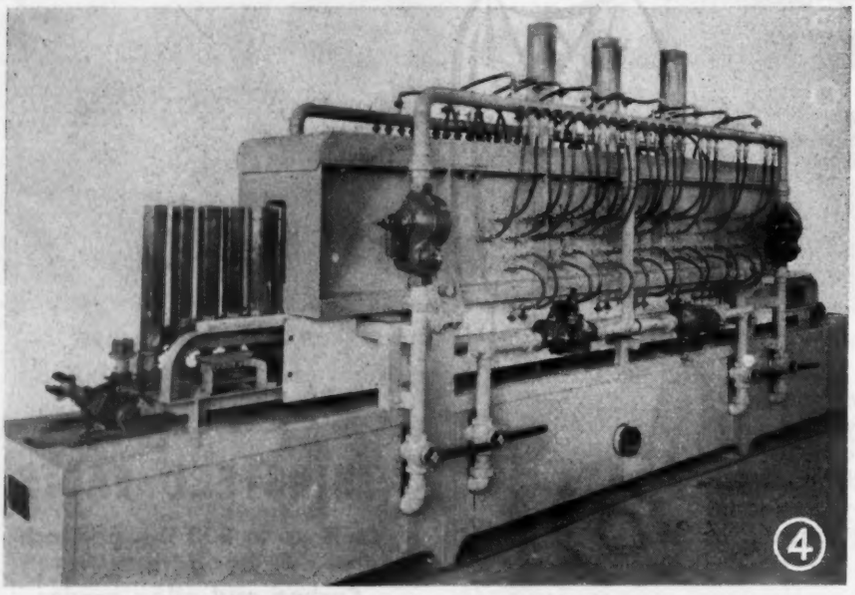

Fig. 4—Machine for brazing 4-piece drawn cap assemblies to hexagonal, seam-welded tubes and annealing the cap end

Gas-Burner Annealing Units: As heat is used for performing various other duties than localized annealing, there is always a possibility of performing such annealing in combination with some other heat operation. Such is the case in a special machine used in the straight-line production of incendiary (oil) bomb cases, shown in Fig. 4. The machine brazes 4-piece, drawn cap assemblies into the ends of hexagonal, seam-welded steel tubes and, in the same operation, anneals the cap end and the upper half of each of the tubes. Its system employs 92 radiant-cup gas burners. Workpieces are carried through on a chain-type conveyor and fitted with spindles that rotate positively once during each 8 in. of travel. As the workpieces mounted on these rotating spindles build up to a temperature of 1200° F, the brazing alloy (which is placed before the work is processed) flows by capillary action into the joints. Farther on, the temperature builds to 1450° F, annealing the tubes to a point 10 in. below the top or capped end. Slow cooling then takes place. This unit processes 1000 bomb cases per hr.

Importance of incorporating both strength and wear resistance in automotive steering assemblies is well known. A unit employing a conveyor and ceramic burners has been designed and built for rapidly annealing a ½-in. diameter, threaded end of a forged and hardened tie-rod-ball used in such assemblies. The general idea is to improve the strength characteristics of the threaded end (which is pierced transversely by a ⅛-in. hole) without disturbing hardness of the part on the opposite or ball end.

The ball end of the part is immersed in ⅝-in. of water for 48 in. of travel from end to end of the machine. The threaded end is heated by 22 in. of parallel rows of gas burners. The bronze roller chain conveyor is fitted with spacer pins. These pins push the parts on parallel ways from the leading point through the annealing zone, and then on through the horizontal cooling zone after which they are moved up an air-cooling ramp to ejector guides. The machine turns out 1500 units per hr, holding each piece under heat for 35 sec. It provides a temperature of 1200° F on the threaded ends of the parts.

Mouth-End Annealing Cartridge and Shell Cases: Much attention has centered on annealing of mouth ends of cartridge and shell cases. Ceramic-cup burners are employed on one type of localized annealing machine. Burner lines are staggered in a zig-zag pattern along the firing zone and heat the case to a point 4½ in. below the mouth. The cases are loaded by hand over centering pins on small 2¾-in. diameter tables, carried on 3-in. centers by a special chain conveyor. Shell case tables rotate on vertical

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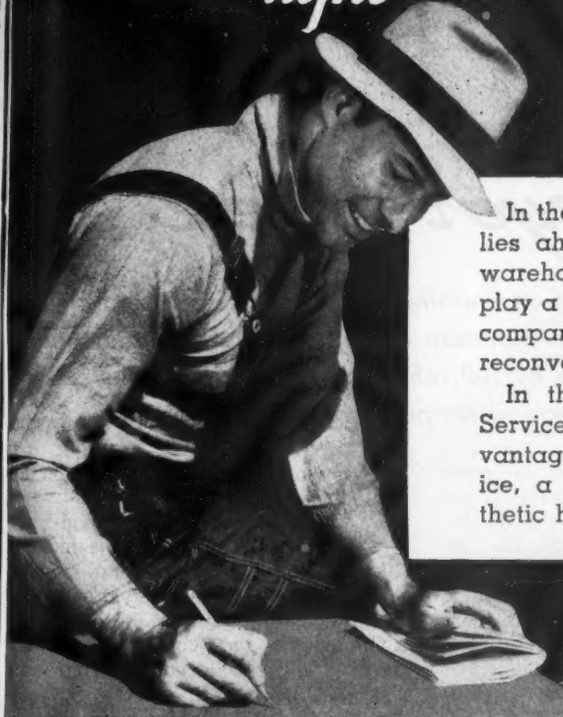

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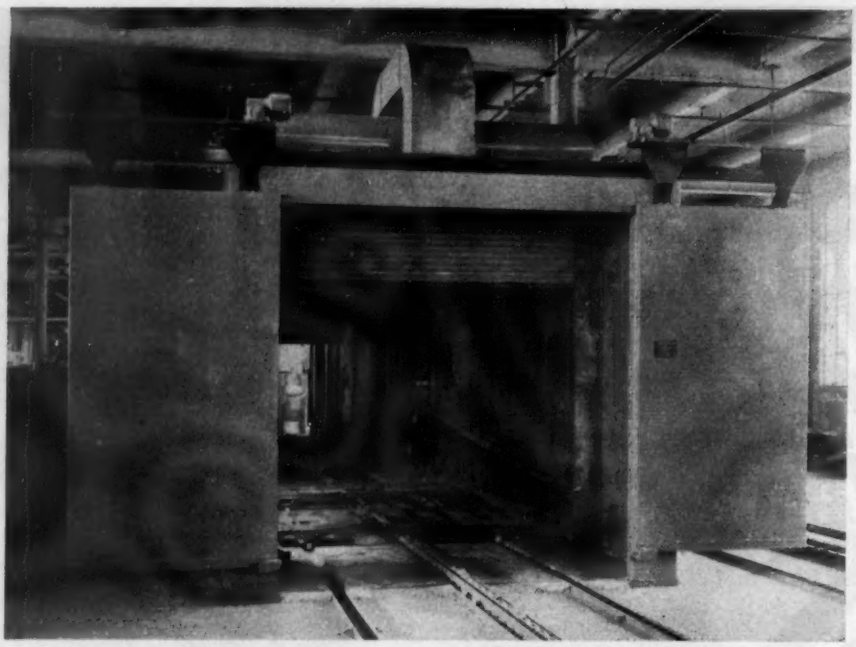


By C. A. LITZLER
Chief Engineer
Industrial Oven Engineering Co.
Cleveland

Fig. 1 (left)—Exit end view of system, showing baking and cooling zones, motorized exit and interchamber doors, conveyor drag chain, trough guide rails and work trucks about to leave oven

Fig. 2 (below)—Heating equipment, control panel, oven conveyors and below-level drag chain motor and gear drives, return and main conveyor lines. All data and photos are from "Products Finishing"

4 Zone Conveyor Oven

. . . . affords dust-free finishing of ordnance items and civilian goods, provides for minimum handling of work, obtains maximum fuel economy by full reheating and recirculating system, handles wide range of temperatures and baking times

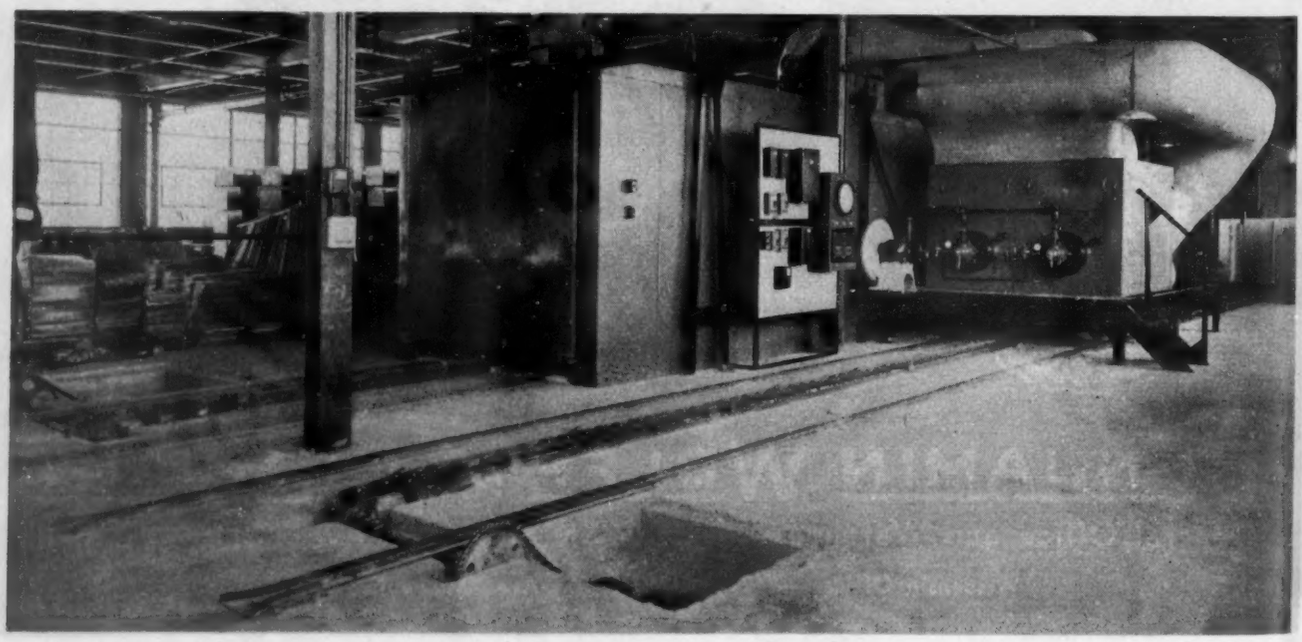
IN A RECENT installation, it was imperative that ordnance assemblies be finished absolutely free of dust. So spray booths were arranged in tandem with the oven conveyor system in such a manner that the work passed directly from the booths into the first zone of the oven system without exposure to dust-laden air. The same method can, of course, be used for dust-free finishing of civilian products, such as metal furniture, office machinery and vending equipment, in the postwar era.

In this installation, to decrease the chance of contact with dust on the freshly finished work, the first zone of the oven system is a pressure-type zone which is supplied with fresh, filtered air, delivered under pressure at room temperature. This air delivery, from a separate steam-heated heating system, builds up a pressure within the zone so that dust-laden air from the shop cannot enter and settle on the work before it is carried to the pre-heating zone.

In addition to the unusual precautions against dust, this system was engineered with three major considerations in mind. They are as follows:

1. Minimum handling of work and minimum labor in operation of the complete oven system.
2. Maximum economy through full utilization of fuel and heated air.
3. Wide range of temperatures and baking times and consequent wide range of usefulness.

Throughout the entire system, all handling of work is conveyorized and, of course, automatic. At the exit end of the oven, trucks loaded with finished work are carried directly to a storage



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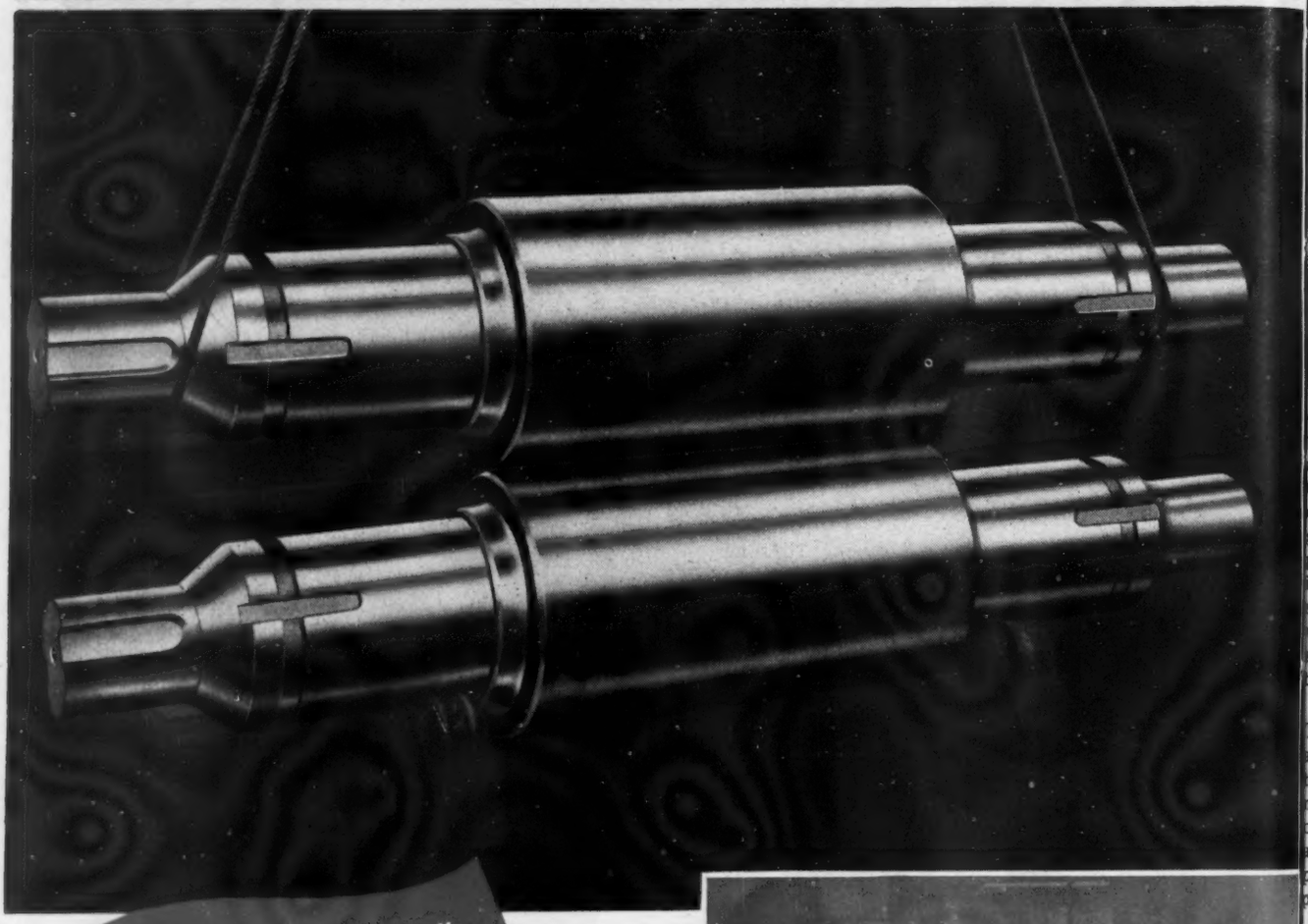
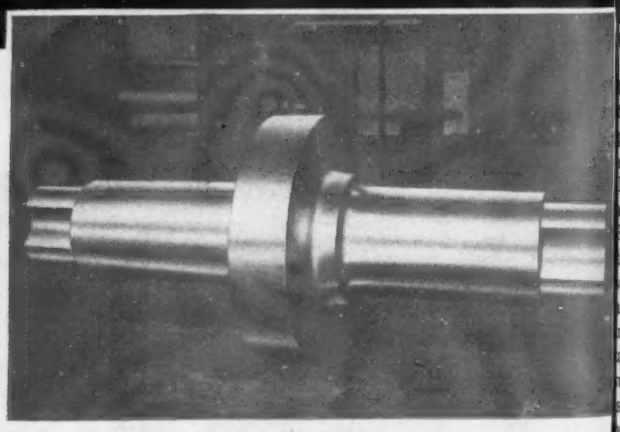


2-Hi Skin Pass Cold Mill Rolls



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and packing area, and after the trucks are unloaded, they are transferred to a return truck conveyor which returns them to the spray booths. The need for oven attendants is eliminated by completely automatic temperature and safety control equipment.

To describe the operation of the system, one truck will be taken through the entire finishing operation, with a description of each component operation.

Spray Booths: Because the production capacity of the entire system required it, two double spray booths of the waterwash type were installed. These booths measured approximately 12 ft wide by 6 ft deep by 7 ft high in the work chamber. The two booths were set facing each other with space between them to accommodate the oven conveyor.

Freshly cleaned metal assemblies are brought into the spray booths directly from the cleaning and degreasing area. Many of the assemblies are large and bulky, and the heavier ones are handled on an overhead tramrail system which is designed to place the units on a turntable for spraying. After spraying, the larger pieces are loaded directly onto the waiting trucks, which are engaged by the conveyor. After being placed on the trucks, the pieces are finish sprayed to completely cover the unsprayed places where tramrail hooks were placed, and then the spray operator starts the conveyor which carries the truck to the ventilation zone.

Oven Zone No. I—Ventilation Zone: The ventilation zone is primarily a separate air-conditioned zone used to store the freshly painted work before it is admitted into the pre-heat zone of the oven proper. The ventilation zone will accommodate three trucks, equaling approximately 15 minutes of spray painting production.

To assure dust-free painted surfaces, the air within the ventilation zone is taken from outside the building and is passed through steam tempering coils until its temperature builds up 70°F. The air is handled by a multi-blade fan and then passed through the steam coils. From the steam coils the air is carried through sheet metal ductwork to the ventilation zone. From this zone the air goes to an exhaust stack at the ceiling and thence to atmosphere. By maintaining this entire zone at positive pressure with filtered and heated air, it is impossible for dust particles encountered in ordinary factory air to be deposited on the work.

Oven Zone No. II—Preheating: The work truck's next movement is into the preheating zone of the oven proper, where the oven exhaust air is utilized to preheat the work and to begin the preliminary evaporation of the paint solvents. It is in this zone that the greatest portion of the solvents are released from the work and immediately exhausted to the atmosphere.

Two excellent results are accomplished:

1. Solvent-laden air is localized in this zone, thereby reducing the solvent concentration in the main baking zone.
2. Finished luster, gloss and hardness is greatly increased due to the fact that the baking zone air is considerably freer from solvent vapors. Final oxidation or polymerization can take place more rapidly and thoroughly.

The advantages that arise from the use of this preheat zone are inexpensively attained, because the heated air for this zone is only the normal exhaust air from the entrance end of the baking zone. Under usual conditions this heated air would be exhausted. Naturally, this exhaust air is at the same approximate temperature as the baking zone. Utilizing this heat in the normal exhaust air, increases the overall thermal efficiency of the system. This directly results in lower fuel costs.

As far as the design of this zone is concerned, it is incorporated in the main oven housing. It is separated from the ventilation zone by horizontal automatic doors. Both doors are in complete control interlock with the main synchronous timer of the conveyor.

Sheet metal ductwork is provided in this zone to direct the waste air most effectively over the work. Suitable exhaust ductwork and fan systems finally remove this air after it has given up its heat to the work.

At this point in the system the solvent content, although far below the lower explosive limit, is no longer suitable for use.

Analysis of several installations of this design shows an entering temperature of the air so diverted of 250°F and a final exhaust temperature attaining 115°F, whereas a solvent analysis discloses an entering vapor content of 0.5 per cent and a leaving content of 1.5 per cent, indicating that two-thirds of all paint solvents are evaporated in this zone. (Solvent concentrations are expressed in volume percentages of solvent vapors in the exhaust air.)

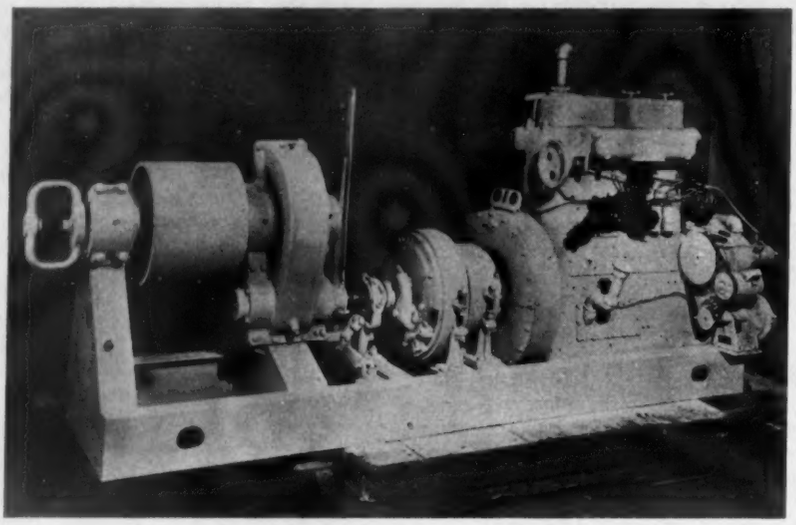
Oven Zone No. III—Baking Zone: From the preheat zone the work is automatically transferred to the baking zone, where the final oxidation of the finish is accomplished.

This zone is equipped with large-volume supply ducts located on either side of the oven and carrying adjustable streamlined high-velocity outlets arranged at the conveyor stop position. At the entering end of this zone a separate exhaust duct and fan system provide the required ventilation and furnish the waste heat air for the preheat zone. At the exit end a recirculation pickup duct returns the hotter oven air back to the air heater for reheating and recirculating.

Naturally, as the work passes through this zone its temperature is increased to the baking temperature. Accordingly, the heated supply-air, after it has passed over the work, is hotter at the exit end and cooler at the entrance. Likewise, for utmost utilization of the heated air, only that air from the exit end of the baking zone is carried back to the air heaters, for recirculation.

Despite the difference in work temperatures from one end of this zone to the other, complete uniformity in the air stream temperatures is maintained by the use of a great number of air changes per unit time. In fact, the volume of air handled in this heating system exceeds the amount that is used in

EVEN IMMERSION: Problem of uneven shrinkage in aluminum ring for bomber engine mount after heat treating is solved by evenly immersing the ring on a horizontal level during quenching. This technique prevents irregular shrinking and warping at Mansfield, O. Works of Westinghouse



All-Welded ENGINE

Gasoline power plant for oil field service is lower in first cost, has greater portability due to 25 per cent less weight, and promises lower maintenance

AN all-welded gasoline engine has been developed for oil field service. Among advantages claimed by its maker are: 25 per cent weight reduction, lower initial cost, easier portability and lower maintenance costs. According to Buffalo Gasoline Motor Co., Buffalo, N. Y., these factors are important because much oil field drilling is done in rough and mountainous terrain, and light weight is essential for rapid transportation and installation.

The power unit shown in accompanying illustration is a 4-cylinder type, operating on either natural gas or gasoline, and is used for drilling oil wells by the cable-tool method. Engine is operated at a speed of approximately 500 rpm when drilling and 1500 rpm when bailing a well or pulling tools. It has a rating of 120 brake horsepower at 1200 rpm, and cylinder bore is 4⅞ in., with stroke of 7 in.

Engine is mounted on wheels or on skids, depending upon the field work and transportation needs. It has an all-welded steel crankcase, engine block, manifolds, base and gear reduction case, all fabricated with Lincoln Electric welding equipment. This engine has withstood many months of severe field service, operating continuously 24 hr per day for 30 to 60 days.

Additional power plants of this type in 6, 8, and 12-cylinder sizes are planned by the manufacturer for production in the near future.

high speed metallic heat treating oven and draw furnaces.

The idea sometimes prevails that handling larger volumes of air is not economical in fuel input. This is actually and mathematically untrue. Large air volumes assure:

1. Close temperature uniformity.
2. Lower exhaust air temperature.
3. Greater heat transfer from air to work.
4. Usually reduced oxidizing times.

Taken overall, an efficiently designed system embodying these advantages can be operated on the same fuel input as other systems. Fig. 1 is an exit end view of the system, showing the baking and cooling zones, exit motorized doors, floor conveyor and trucks.

Oven Zone No. IV—Cooling Zone: Normally, after completion of the baking in some oven systems, the work is discharged from the oven and allowed to cool (give up its heat) in the room. However, in this completely engineered system, it was decided to utilize the heat that is carried out of the baking zone by the work proper. This was done simply by the installation of a forced cooling system within the oven system and by recuperating the heat in the work.

Accordingly, a separate zone was incorporated and separated from the baking zone by vertical motorized doors and from the ends of the oven proper by means of horizontal motorized doors. These sets of doors were tied into the synchronized operation of the conveyor so that the doors opened on conveyor operation and closed on conveyor rest.

The cooling zone proper is an insulated enclosure which is equipped with adjustable air inlet grilles mounted in the side walls at the floor level. The grilles also carry air filters for dust removal. From these filtered grilles the room passes into a fan and duct system which delivers this air under pressure to and over the work. Naturally this air cools the work and as the air picks up the heat from the work, its temperature is increased. The temperature of the cooling air ultimately reaches approximately 75°F at the point where it leaves the cooling zone. From the cooling zone the air is carried in a separate duct built inside the oven to the inlet side of the air heaters, where it goes into the heaters as fresh makeup air.

Normally this makeup air comes from the room or from the outside at temperatures usually around 70°F. As decreed in this design of heating system, the makeup air goes into the air heaters at a 100 degrees higher temperature. This temperature difference asserts itself in decreased fuel consumption by a partial recuperation of the incipient heat that is in the work. In normal systems this heat is completely wasted.

This same basic principle has been previously used by this company for not only paint finishing but also core baking, rubber processing and high speed continuous multicoat saturation and lacquer finishing of insulated wire and cable, textiles and cordage.

In leaving the cooling zone the work has dropped to a temperature of approximately 115°F. and as a result, it is now cool enough for handling, as the finish is hard baked and not tacky or sticky.

However, in this one particular installation, the next operation (packing) could not be done at close proximity to the discharge end of the oven. Accordingly the work remains on the truck and is carried by an oven conveyor until it reaches the packing area, 40 ft from the oven proper. Then at that point the loaded trucks are automatically discharged from the drag conveyor. Here the trucks are manually unloaded. The empty truck is thereupon pushed onto a return conveyor which delivers it at the starting end of the system. The return truck conveyor can be seen in Fig. 2. It is shown running along the oven proper and underneath the air heater platform for space saving.

The foregoing describes in detail the following finishing operations, all of which are broken down into automatic or semi-automatic continuous operation:

1. Surface cleaning.
2. Paint spraying.
3. Surface ventilation.

(*Please turn to Page* 186)

A Handful of Reasons

WHY Wells No. 8 IS A WISE INVESTMENT

VERSATILE

The Wells will cut most any shape, size or type metal you can get into it. It will take overall sizes up to 8″ x 16″ rectangles and 8″ rounds, solid stock, tubing or structural steel.

PORTABLE

Because the Wells is portable you can move the saw to the work and save time and labor in so doing.

EASY TO OPERATE

Gravity feed and automatic shut-off enables one man to operate two or more Wells Saws. Even an inexperienced operator can do a lot of work with this simple handy tool.

ECONOMICAL

Low in first cost, uses little power, requires little maintenance. Saves money, time, labor, steps up production.

DURABLE

Ruggedly constructed of quality materials, with a minimum of moving parts, the Wells will deliver years of faithful, efficient metal cutting.

SPECIFICATIONS

CAPACITY:
Rectangular . . 8″ x 16″
(Special Guides) 5″ x 24″

ROUNDS: . 8″ diameter

MOTOR:
½ H. P., A. C. or D. C.

SPEEDS: Selective 60, 90, 130 feet per minute

WEIGHT:
Approximately 750 lbs.

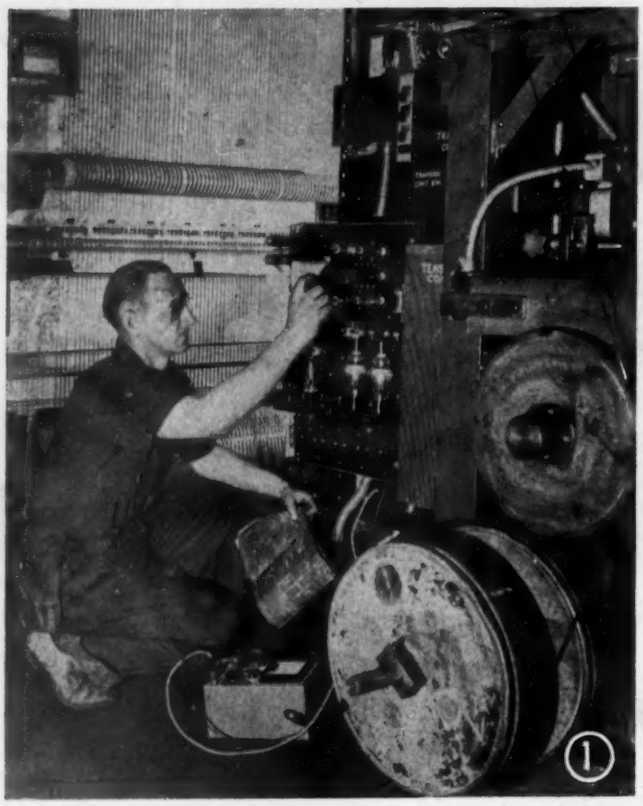
Wells SAWS

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN



NEW WIRE REWINDING EQUIPMENT *Triples Production*

Mechanical improvements on wire rewinding lines and adoption of electronic control of drive result in an increase in wire speed to bobbins as well as a constant wire speed throughout full bobbin buildup. New and old methods of bobbin winding compared

Fig. 1—Final adjustments being made to electronic drive applied to wire speed control capstan in wire enameling system, General Electric Co.'s shop

By P. SOMERVILLE
General Manager
and
L. R. HUNT
Engineer
Jones & Laughlin Steel Corp.
Muncy, Pa.
and
J. D. CAMPBELL
Steel Mill Section
Industrial Engineering Division
General Electric Co.
Schenectady, N. Y.

MAJOR STEPS in the manufacture of wire rope are drawing, rewinding, stranding, and closing. In the rewinding process, the individual wires going into the strands are first unwound from loose coils, then carefully rewound on bobbins. Rewinding the wire on bobbins is time-consuming but important, since properly wound bobbins materially contribute to the quality of the strands.

In the plant of the Jones & Laughlin Steel Corp., Gilmore Wire Rope Division, Muncy, Pa., the wire rewinding department winds 80,000 to 125,000 lb of wire every 24 hr. Taking 0.041-in. wire as the average, over 4000 miles of wire are wound there in a 24-hr day.

Former Methods of Rewinding. For several years at this plant wire had been rewound on group winding machines, each consisting of six winding bobbins and six unwinding swifts. The bobbins were driven by one constant-speed induction motor, through line shafts, gears, and individual disconnecting clutches. Wire tension was obtained by a mechanical friction brake consisting of a snubbing rope around a sheave on the swift. With the bobbin driven at constant rpm, the wire speed would be, for example, 330 fpm with an empty bobbin and 800 fpm with a full bobbin. Thus the average wire speed during the entire winding process was approximately 600 fpm.

The disadvantages of the original group winding machines may be summarized as follows:

1—Low average winding speeds of perhaps 700 fpm or less were general.

2—In recent years, the maintenance on gears, bearings, clutches, and other mechanical parts became high. Furthermore, a breakdown on one machine might put six lines out of service.

3—Because of the antiquated manila rope friction drags on the swifts, uniform winding tension was not easily obtained since the friction varied and often the worn ropes broke.

Thy-mo-trol Drives Applied. New mechanical and electrical equipment was applied to the rewinding lines (Fig. 2 and 3). First, the mechanical equipment was redesigned so that all gears and clutches were eliminated and each line could be operated individually. Then Thy-mo-trol (thyratron controlled) drives —four 2-hp units (Fig. 3) and four 1-hp units—were applied. Each of these lines consists of a dc drag generator on the swift, a dc bobbin motor, and the electronic control equipment.

The redesigned mechanical equipment and the addition of the new drives re-

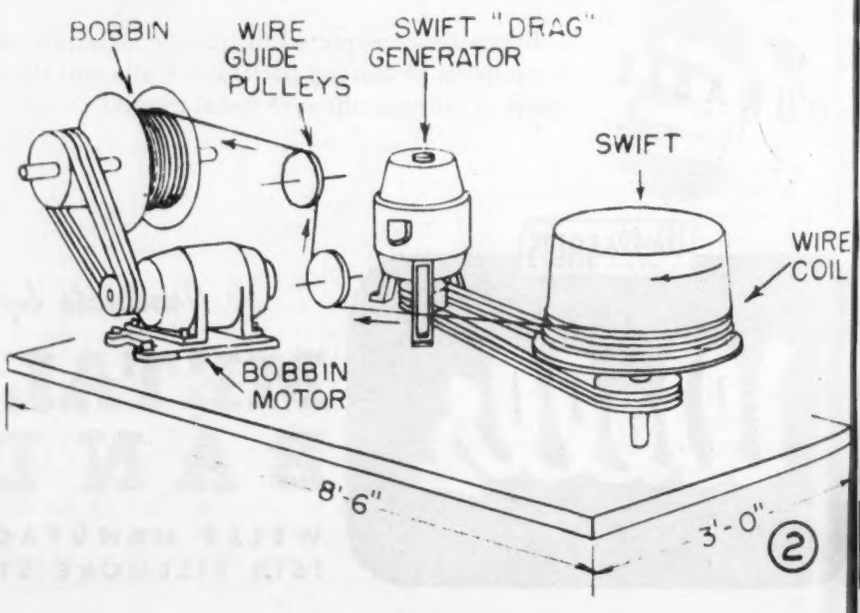
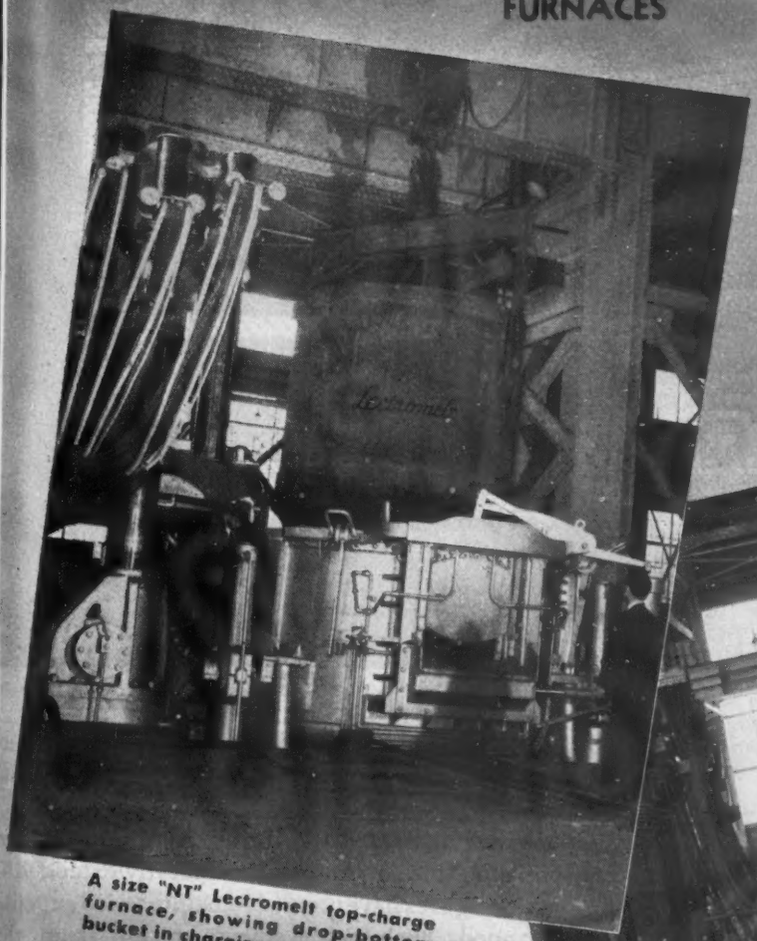


Fig. 2—Arrangement of typical electronically controlled wire rewinding unit

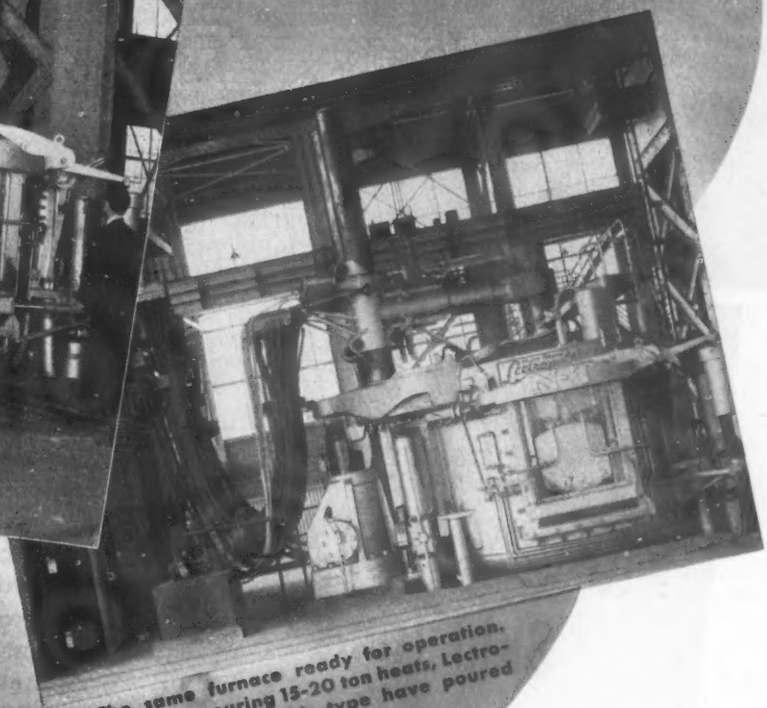
MOORE RAPID

Lectromelt

FURNACES



A size "NT" Lectromelt top-charge furnace, showing drop-bottom bucket in charging position.

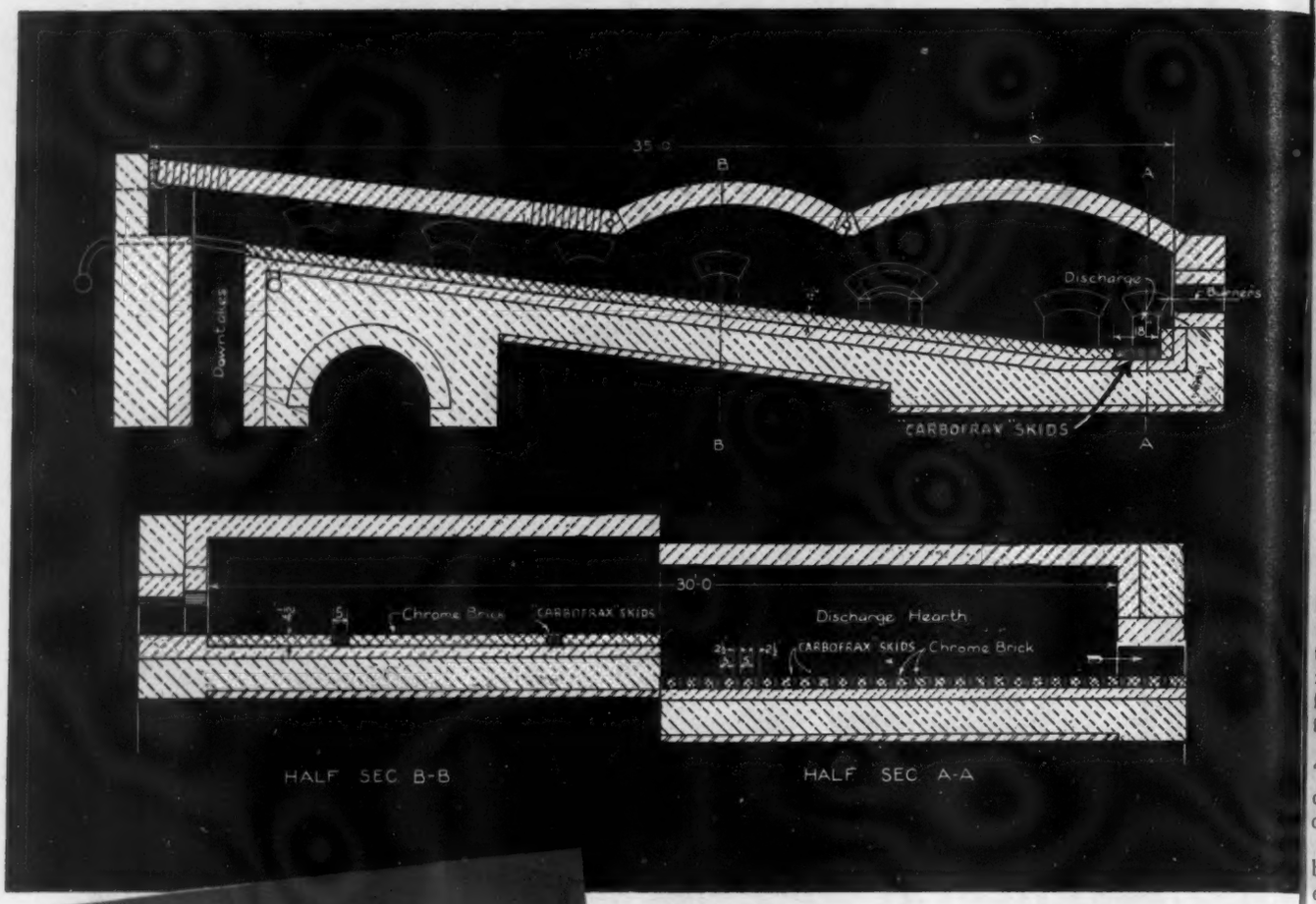


The same furnace ready for operation. Normally pouring 15-20 ton heats, Lectromelt furnaces of this type have poured double their rated capacities.

Moore Rapid Lectromelt furnaces are daily melting quality steels and irons in foundries and ingot shops throughout the world. They are available in capacities ranging from 100 tons down to 25 pounds.

PITTSBURGH LECTROMELT FURNACE CORPORATION

PITTSBURGH 30, PENNA.



Hearth life increased 1500% with "CARBOFRAX" Skid Rails

Thirty-two weeks' service, instead of the two weeks' use previously obtained, resulted from installing "CARBOFRAX" silicon carbide brick in the side discharge section of this merchant mill furnace. This outstanding improvement, 30 additional weeks' service over the former two—a gain of 1500%, was readily and simply accomplished . . . the diagrammatic sketch shows how the "CARBOFRAX" brick was placed.

Unusually severe abrasion plus elevated temperatures were just too tough a combination for ordinary refractories . . . wore them down rapidly. Repairs to the push-out hearth were practically a continuous operation.

But with "CARBOFRAX" brick in the discharge section, the furnace campaign is greatly extended—production figures have jumped—maintenance expense has dropped. Such achievements result from the extraordinarily high load-bearing and abrasion-resisting properties of "CARBOFRAX" brick at elevated temperatures.

These unique properities make the use of "CARBOFRAX" skid rails in any sloping hearth definitely advantageous. They provide longer life, lower costs and increased production.

For more information on "CARBOFRAX" skid rails and their application to various types of heating furnaces, write for your copy of '"CARBOFRAX" Refractory Skid Rails.'

THE CARBORUNDUM COMPANY
Refractories Division, Dept. R-5
Perth Amboy, New Jersey

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Super Refractories by CARBORUNDUM TRADE-MARK

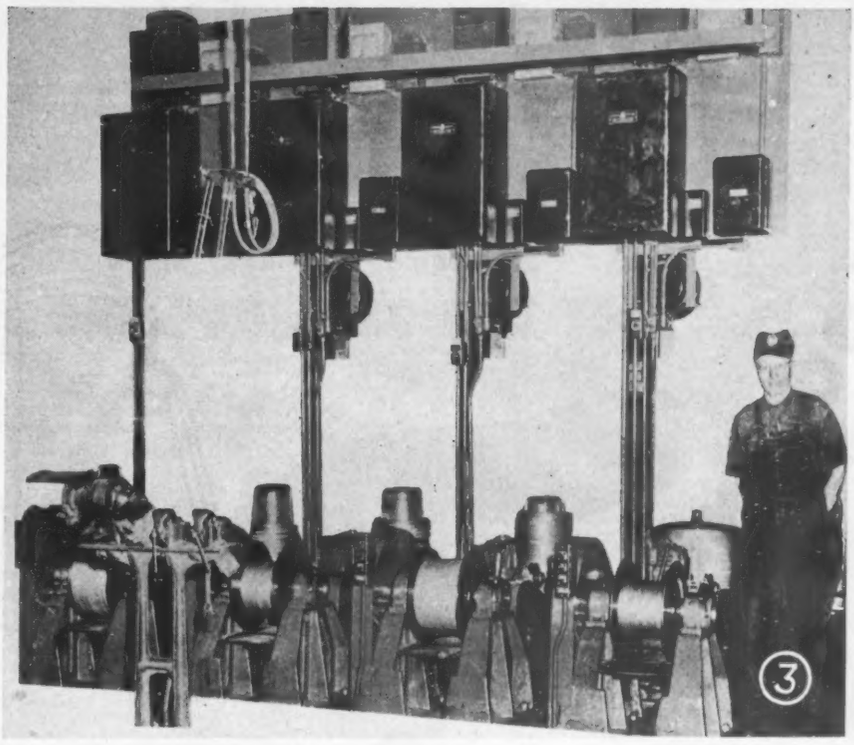

Fig. 3—Four typical wire rewinding lines, showing bobbins in front and unwinding swifts in rear. Thyratron motor control cabinets are mounted overhead

sulted in the following gains over the old group wire winders:

1—Production per line was increased at least three to one, largely because of higher average wire winding speeds of 1500 to 2000 fpm.

2—Wire speed was maintained constant over the full build-up range of the bobbin.

3—Maintenance costs dropped, principally because of the reduced complexity of the mechanical equipment.

4—Because of the arrangement of the electric and mechanical equipment, only one-half of the former floor space was required per line.

5—With electric braking at the swift, the wire was wound tighter and more uniformly on the bobbin. This increased the wire weight from 10 to 15 per cent more per bobbin than formerly, and uniform winding reduced wire breaks in the stranding machines.

6—Because each winding line is a "packaged" unit, a delay on one unit does not necessarily cause delays on other lines.

7—With the new equipments, wire-break limit switches automatically stop each line when a wire breaks, or when the end of the wire leaves the swift. Operators are thus enabled to devote themselves to other work, since they are not required to watch every line.

Operating Principles. Fig. 4 shows in schematic form how the new equipment has been successfully applied to wire rewinding. The bobbin motor is rated 1 hp, 690/1380 rpm, 230 v, dc, on each of the four lines. On each of the other four lines for winding heavier wire, the bobbin motor is rated 2 hp, 1150/2300 rpm, 230 v dc. Experience has indicated that the horsepower rating of the swift generator should be one-third to one-half the rating of the bobbin motor. (Not shown in Fig. 4 are the wire guides for automatically laying the wire in layers on the bobbin.)

Success of the method employed depends entirely upon the fact that the wire leaves the swift at an almost constant unwinding radius. That is, the loose wire coil is thrown on the swift so that the inner wrap of the coil is "peeled" off the swift at the bottom inside corner at "P" of the swift core. Therefore, the linear wire speed as it leaves the swift is directly proportional to the swift revolutions per minute. With this fact in mind, it will be seen that the swift generator really serves two distinct functions:

1—By loading the swift generator armature on an adjustable braking resistor, a means of changing wire tension is obtained.

2—With a fixed shunt field setting on the swift generator, the voltage from this generator will be closely proportional to wire speed (or swift revolutions per minute).

Thus the swift generator is made the means of controlling wire tension and indicating wire speed.

Still referring to Fig. 4, the bobbin motor armature voltage and shunt field are under the control of the Thy-mo-trol equipment indicated. The control is essentially a speed regulator on the bobbin motor so as to keep the wire speed (as indicated by voltage X-Y) practically constant. With the wire at full running speed of, say, 2000 fpm, and with the bobbin having only a few wraps or wire, the bobbin motor will have full armature voltage and a weak field setting. As the bobbin builds up, the wire speed will tend to increase and thus slightly increase the voltage at X-Y.

The speed regulator action will tend to maintain voltage X-Y constant, however, by slowly strengthening the bobbin motor field. A slight increase in voltage X-Y will strengthen the bobbin motor field. With full build-up on the bobbin, the bobbin motor will have practically full field, and the wire speed will be the same as with the empty bobbin. Therefore, it is not only possible to operate at a higher wire speed than formerly, but also to hold constant wire speed throughout the full bobbin buildup.

Operating Procedure. The operator has only a few adjustments to make and

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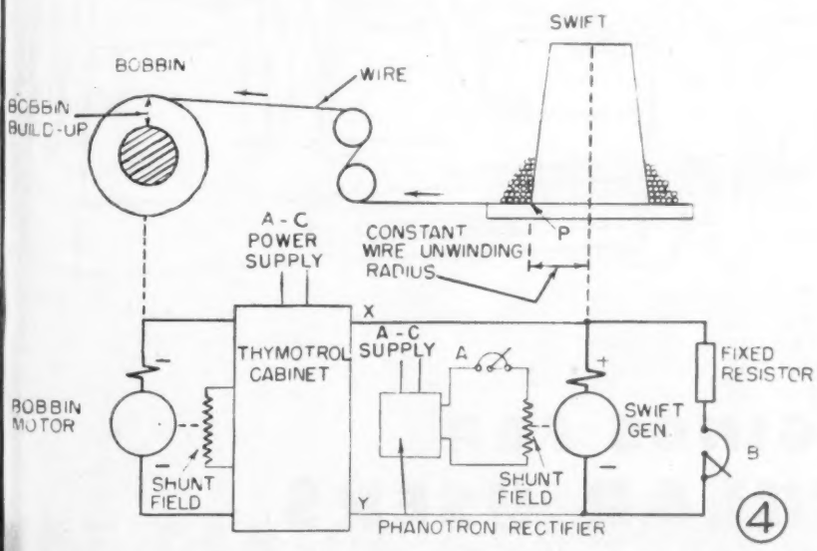

RHEOSTAT "A" FOR FIXING WIRE SPEED FOR VARIOUS SWIFT CORE DIAMETERS
RHEOSTAT "B" FOR CONTROLLING GENERATOR LOADING AND HENCE WIRE TENSION
CONTROL WIRES X-Y FOR GIVING THYMOTROL AN INDICATION OF WIRE SPEED

Fig. 4—Schematic diagram of armature circuit

. . . . LOOKING FOR QUALITY FORGINGS ? .

FORGINGS FOR
PARTICULAR USERS
SINCE 1903

CLOSED DIE FORGINGS
FROM ONE POUND TO ONE TON
Metallurgically Controlled

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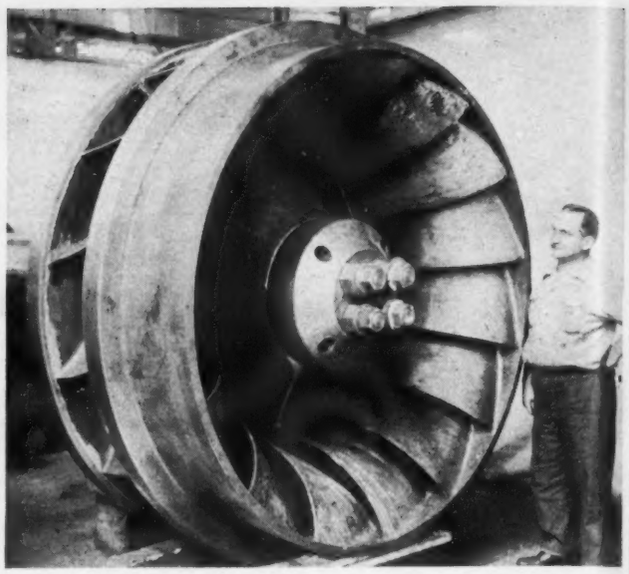
High-Head Turbine

Built for Mexican hydroelectric project, new turbine is vertical-shaft type designed to supply 39,000 horsepower under head of 1028 feet, highest for its kind in western hemisphere



Above—Francis type runner, 70 in. in diameter, containing curved turbine blades

SECOND of three unusual turbines destined for a Mexican hydroelectric power plant which is to operate with the highest "head" for this type unit in the western hemisphere is being built by Baldwin Locomotive Works, Philadelphia. The first turbine already has been installed and is in operation.

The turbines are part of the Ixtapantongo Development of the Comision Federal de Electricidad, located on the Tilostoc river about 100 miles southwest of Mexico City. The installation is to supply power through the Mexican Light and Power Co.

Each turbine is to provide 39,000 hp under a head of 1028 ft and the total additional power generated will take Mexico City off power rationing. At present, current has been rationed so that citizens and industries are afforded power only for eight of each 24 hr.

First turbine installed has the distinction of being the most powerful hydroelectric unit in Mexico and the highest Francis-type turbine ever built in this hemisphere. The unit is of the vertical shaft type, and is provided with a butterfly valve and a Pelton relief valve to prevent pressure rises for load rejection.

This high head requires about 372 cu ft of water per second to develop full power. The runner, which contains the turbine blades, is 70 in. in diameter. Weight of the complete unit is 260,000 lb.

Each turbine takes approximately 12 months to build. The first required about 70 new detail design drawings for the construction of complicated machinery in the shops. Parts for the turbine were made at Eddystone plant, while the steel castings were made by Baldwin's Standard Steel Works Division at Burnham, Pa.

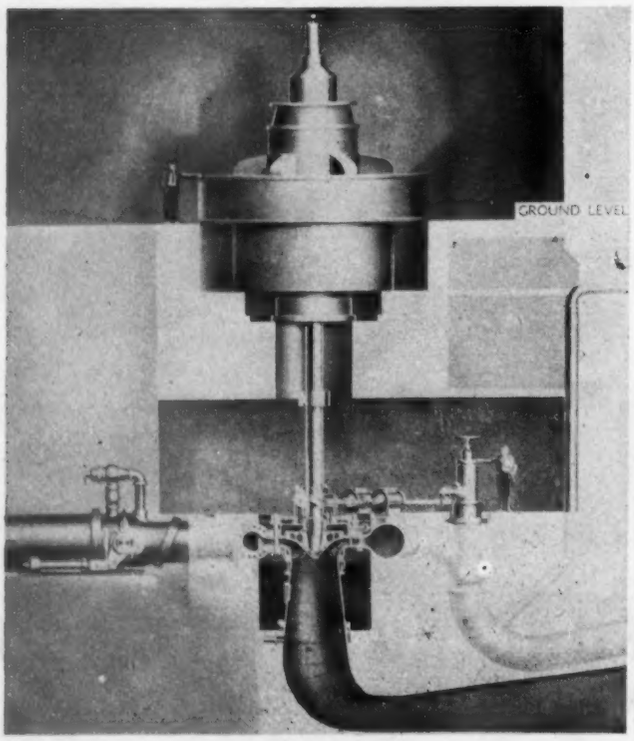
Some idea of the unusual character of these turbines may be gained from contrasting them with low-head turbines built between 1940 and 1943 for the Watts Bar Development of TVA on the Tennessee river between Knoxville and Chattanooga.

Watts Bar is one of nine dams on this river built for improvement of navigation, flood control, power generation and control of soil erosion. Baldwin has built all hydraulic turbines in four of these plants and part of the units which were constructed in a fifth plant.

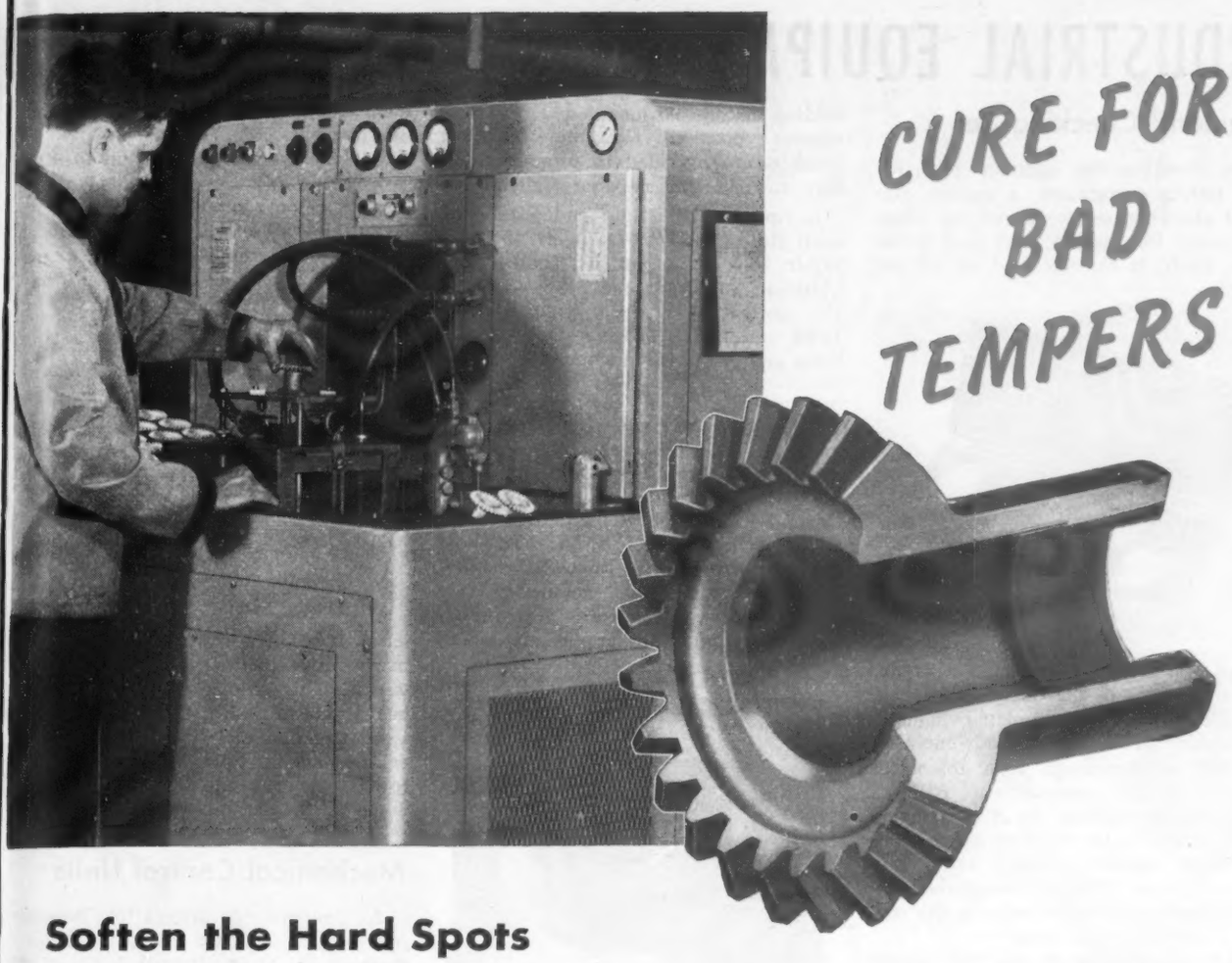
Five units were built for Watts Bar and are now in operation. They are of the vertical shaft, adjustable blade or Kaplan propeller type, each designed to develop 42,000 hp under a net head of only 52 ft. Due to the low head, the units are of very large physical dimensions, since each unit must handle 7930 cfs. This large runner is 19 ft, 6 in. in diameter, and weight of the complete unit is 1,340,000 lb. Each turbine required about 18 months for its construction.

Comparison with Mexican turbines having a head of 1028 ft as against 52 ft offers engineers an unusual example of the effect of the heads available upon design characteristics and physical dimensions. Power developed by each unit is nearly the same, but in all other respects they are very different. To get this almost equivalent power, the high head requires a mere 372 cu ft of water as against 7930 cu ft for the Watts Bar turbines, and the weight of the new turbines for

(*Please turn to Page* 194)



Left—Sectional view through turbine built for Mexican power project, showing how water passes through penstock to turbine blades in runner, lower center. Butterfly valve at left is used to shut off water when turbine is down. Relief valve at right prevents excessive pressure rise when load is dropped on unit suddenly and turbine gates are rapidly closed. Generator at top is connected to turbine by shaft



CURE FOR BAD TEMPERS

Soften the Hard Spots

... Eliminate Tool Breakage with the TOCCOTRON

NASH-KELVINATOR, Aircraft Engine Division offers this suggestion to shop executives who are vexed with the tool-breakage bogey.

Anneal the portion of the part to be machined. Do this without disturbing previous hardening where desired by localizing the annealing with TOCCO Induction Heating. Results for a number of their aircraft engine parts: breakage of expensive broaching tools and resultant delays are now nil. The gear illustrated, for example:

Leakage of the carburizing gas through the copper-plating on the inner surface resulted in hard spots when whole piece was carburized and hardened. When splines were cut, tools often broke.

Now . . . that area for a depth of .025-.040 inch is heated to 900-1000° F. with a 20 K.W. TOCCOTRON. Heating time is 2 seconds. The part is then cooled by an integral quench to facilitate handling. Total treating time per part is only 3.4 seconds. The uniformity of this localized induction heating assures perfect results on every part.

Find out how the new TOCCOTRON (Electronic Tube model) or TOCCO (Motor-Generator models) can help solve *your* problems of war production and postwar planning. "Results with TOCCO", Bul. 14, gratis.

THE OHIO CRANKSHAFT COMPANY • Cleveland 1, Ohio

TOCCO

INDUCTION

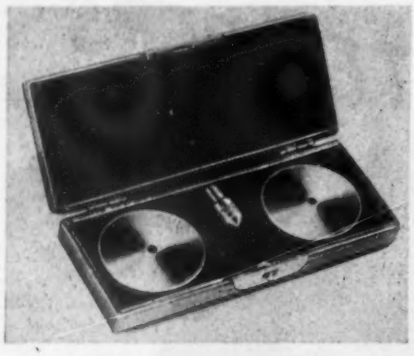
HARDENING, BRAZING

ANNEALING, HEATING

INDUSTRIAL EQUIPMENT

Diamond Checking Set

For checking the accuracy of hardness testing equipment, a master diamond checking set is offered by Clark Instrument Inc., 10200 Ford road, Dearborn, Mich. It can be used on all the



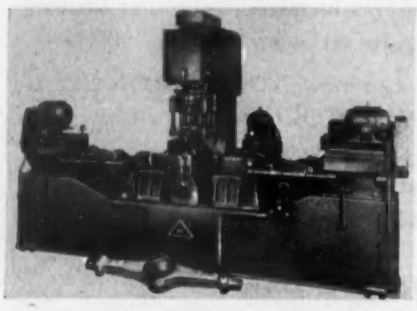
company's hardness testers and other instruments used for rockwell testing.

Set consists of a gold-plated diamond penetrator and two test blocks. Penetrator is made to exceedingly close tolerances to give accurate measurements required for checking readings. As it is designed to be used only for checking purposes, it retains its original accuracy for a long period of time. When checking, the master diamond penetrator replaces the regular penetrator in the machine.

Held to close limits, the two master test blocks are used in connection with the master diamond. Resulting combination furnishes an accurate check of machine, either as a periodical measure or whenever readings may be in doubt.

Drilling Unit

Four standard twin ram hydraulic units combine to form the new machine offered by LeMaire Tool & Mfg. Co., Dearborn, Mich., for drilling 29 holes



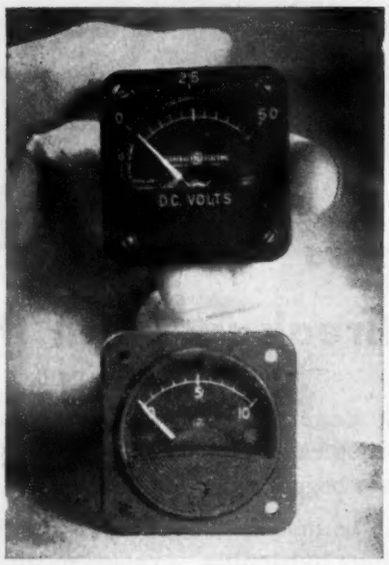
from four directions in a truck axle mounting or carrier. Two units in the horizontal position are located at opposite ends of a long main base, from the middle of which an auxiliary base extends to the rear to accommodate the third horizontal unit. The fourth unit, which operates vertically, is mounted on a column that straddles the rear unit.

A cam and lever quick-action, workholding fixture is mounted in a convenient position for the operator. Brackets are provided to support guide bars to maintain necessary alignment.

In operation the right and left hands each drill six 27/64-in. holes and one 1/2-in. hole; the rear head drills five 27/64-in. holes and one 21/64-in. hole; the vertical head drills eight 5/16-in. holes and one 27/64-in. hole. All 29 holes are drilled simultaneously.

Indicating Panel Instruments

A new line of 1½-in. electric indicating panel instruments is announced by General Electric's Meter and Instrument Division, Schenectady, N. Y. To meet the need of the armed forces for smaller, more compact and weather resisting equipment, two forms are available; a watertight design for application where



the equipment may be accidentally submerged in water, exposed to rain, or used in extremely humid climate; and a conventional design for use in aircraft or for other service where instrument will be protected from the elements.

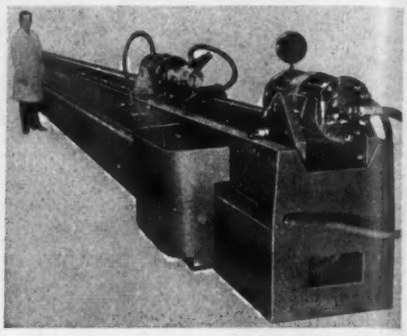
The watertight instruments are known as Type DN-1, DN-2 and DN-3 and the conventional are Types DN-4, DN-5 and DN-6. Both instruments have the same basic design in utilizing an internal-pivot element combined with the permanent magnet moving coil construction.

Pivots are solidly mounted on the inside of the armature shell.

Stretch-Leveling Table

A new hydraulic stretch-leveling table, developed for permanently straightening and leveling long narrow metal sections that are twisted, bent or otherwise distorted after rolling or heat treatment, is announced by Hufford Machine Works Inc., 207 North Broadway, Redondo Beach, Calif.

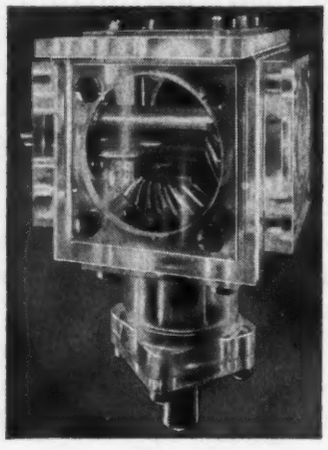
Machine handles sections up to 40 ft in length of any shape and many materials. It not only straightens the stock by establishing a "set" in the metal through a slight predetermined stretching of ma-



terial, but can also be used in conjunction with a die for stretch forming the workpiece to contours up to 30°. The unit has a pull capacity of 40 tons with a 19-in. stroke on each hydraulic piston, but can be built in higher or lower capacities to meet varying requirements of straightening work.

Mechanical Control Units

A standardized system of remotely operated mechanical controls is announced by M. L. Bayard & Co., 1909 Indiana avenue, Philadelphia 32. The control system is used on equipment such as cranes, winches, windlasses and steering gears and for opening and closing



large valves with motors, ventilators and for the operation of banks of furnace doors, factory windows, etc.

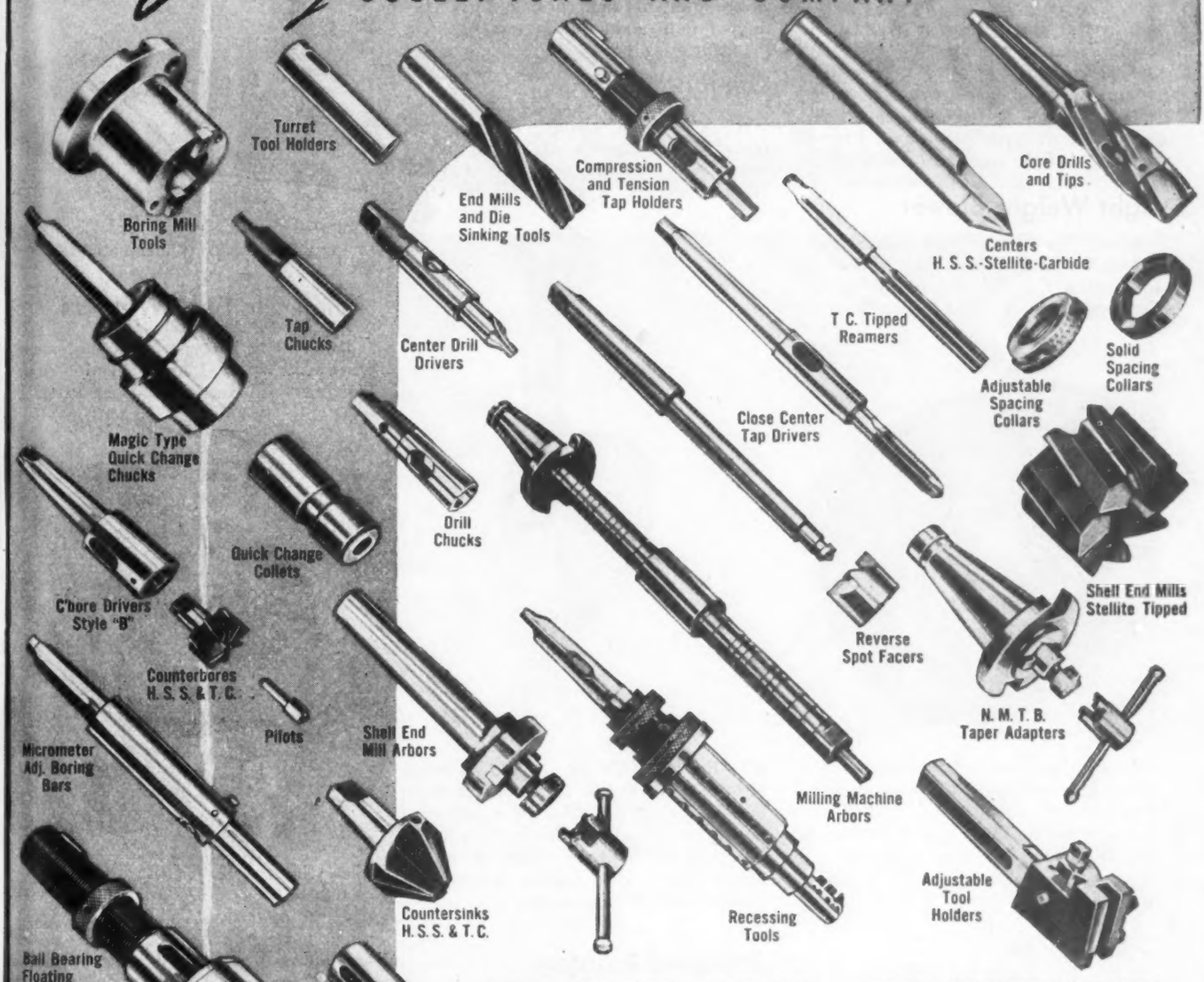
The related units are suitable for power operation under speeds not exceeding 1800 rpm. Terminal connections are constructed so that rearrangement of the same units can be made without disturbing the assemblies or affecting their internal adjustment.

The steady shaft assembly is engineered in two standard types. One is for attachment to surface which is square to the

(All claims are those of the manufacturer of the equipment being described.)

High PRODUCTION TOOLS

by SCULLY-JONES AND COMPANY



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Where cutting speeds must be increased to keep pace with modern methods, Scully-Jones and Company tools will effect a substantial saving by increasing production, giving better finish, longer tool life at a lower cost per unit produced.

Years of experience and engineering knowledge assure the correct tooling for your job. Our facilities provide prompt and dependable service.

Kindly send drawing or specifications for quotations.

Heavy Duty Tap Holders	Square Hole Sockets	"Feed as You Need" Chucks
Cutter Chucks	Plain Sockets	Adjustable Extension Assemblies
Cutter Adapters	Hardened Sockets	Facing and Chamfering Tools
"Use-Em-Up" Sleeves	Bearing Sleeves	Wear Resisting Alloy Tools
Plain Sleeves	Shell Drills	Heavy Duty Floating Holders
Drill Sleeves	Boring Bars	Turret Lathe Tools
"Use-Em-Up" Sockets	Driving Bars	Undercutting Tools

Also Tools of Special Design to Meet Your Particular Machine Operations

SCULLY-JONES AND COMPANY 1901 SOUTH ROCKWELL STREET CHICAGO 8, ILLINOIS, U. S. A.

shaft, particularly suitable for deck, bulkhead, or any other watertight mounting. The other is for attachment to surface which is parallel to shaft. Full freedom is possible with the spiral bevel gear assemblies, illustrated here, because all shaft ends are interchangeable. Either two shaft ends or three shaft ends, depending upon type desired, are connected to other control units.

Universal shaft assembly is made in lengths ready to be installed, or with one end yoke to be field welded after tube is cut to suitable length. Telescoping splined portion between the end yokes permits ready installation and removal without disturbing other control units.

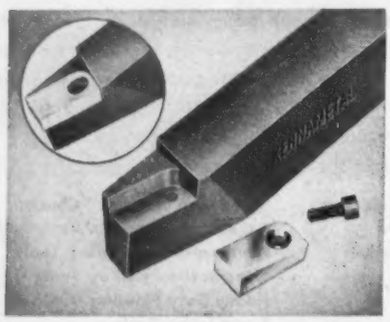
Light Weight Blower

Model No. 2½, a new light weight blower for heat dispersion is offered by L. R. Mfg. Co., Division of Ripley Co., Torrington, Conn. The 1-piece housing

with an aluminum motor plate is 4½ in. from top to bottom. Operating under all conditions of climate and temperature, the unit weighs 3½ oz and delivers 50 cfm at 8000 rpm. It is available with shaft boxes measuring either 0.1895-in. or ¼-in.

Tool Blanks

Kennametal Inc., Latrobe, Pa., has developed a new type tool blank with a drilled and counterbored hole to pro-



vide for attachment to steel shank by a recessed head cap screw. The angularly set screw holds the tip against the recess walls which resist the main cutting thrusts. These blanks are available in several large sizes with formed clearance angles, right or left hand, and in all standard grades of Kennametal.

Complete tools of various styles, straight edge, lead angle, offset, etc., can now be supplied with the screwed-on tips, or separate standard blanks will be supplied to those who wish to make their own tools. Blanks of nonstandard shapes and sizes having this feature may also be had for special tools such as are used in shell turning, form cutting of radii and grooves, etc.

Six-ton Clamp

A new 6-ton clamp, weighing 50 pounds and capable of lifting plates from 0 to 1½ in. or from ½ to 2 in. in thickness, is announced by Mer-

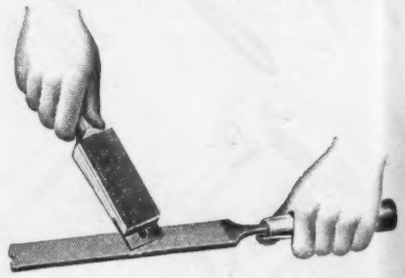
rill Brothers, 56-21 Arnold avenue, Maspeth, N. Y. It is proof tested to double its rated load. In a series of destruction tests it has developed a breaking load of 30 tons. Grip is instantaneous, even when applied in horizontal position and releases easily.

Insulated Resistors

Integrally molded in one operation under laboratory controlled production standards, type CM insulated resistors have been designed by Stackpole Carbon Co., St. Marys, Pa. to meet recently issued Army and Navy specifications. The units are available in 1/3 (RC-10); 1/2 (RC-21); and 1 watt (RC-30) sizes in all required ranges. Their construction is such that they offer an exceptional degree of stability under load.

File Cleaner

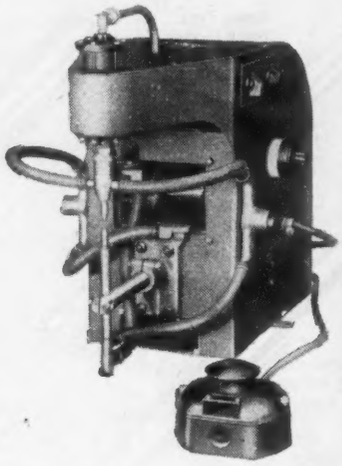
Hargrave file cleaner with a chip plow cleans a file of soft metal chips—lead, copper, aluminum and soft steel. A special square shaped plate made of soft steel is fastened to the frame of the file cleaner and is used by striking one edge on the file to be cleaned, thus impressing the tooth pattern on the edge. Plow is then pushed parallel to the file grooves. It "plows" out imbedded chips and dirt. When a file of different tooth spacing is to be cleaned, a new edge of plate is used. When nonmetallic dirt is to be removed, the regular file card with tempered steel wire teeth is used. This tool



is offered by Cincinnati Tool Co., 4108 Montgomery road, Cincinnati 12.

Automatic Spot Welders

Two new bench type midget automatic spot welders are offered by Interstate Machinery Co. Inc., 1431 West Pershing



road, Chicago 9, for precision welding of light metals. They are available with built in automatic weld timer or with separate timer panel for stitch welding and automatic repeat pulsation welding or synchronous 1-cycle timer. Units are equipped with water cooled transformer electrodes and tips. Air operated, they are controlled by foot switch, solenoid valve and pressure switch.

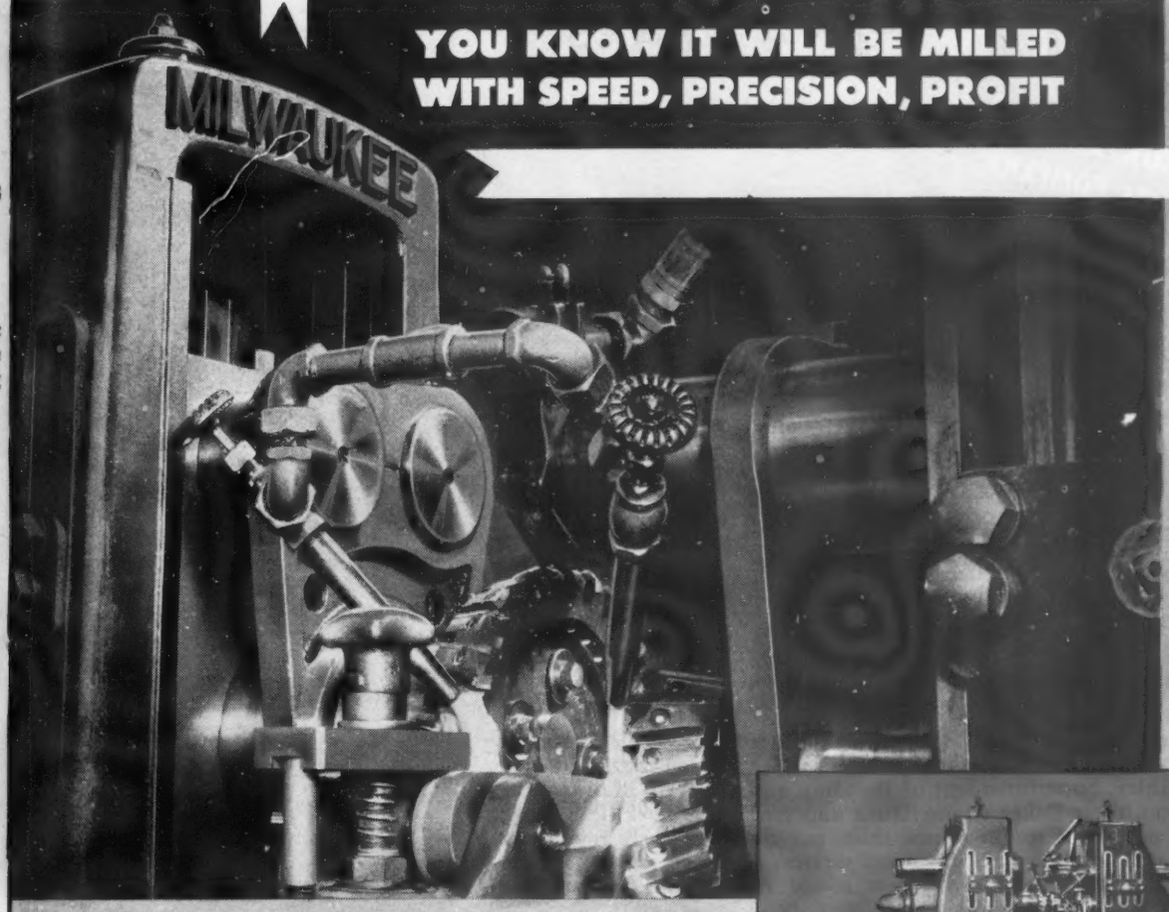
Radius Brake

A precision radius brake is offered by O'Neil-Irwin Mfg. Co., Minneapolis 15, to eliminate the possibility of fracture or disintegration developing at the line of forming while working such metals as duraluminum, chrome molybdenum, rust resistant and spring tempered alloys and various other low ductile materials. Case hardened and spring tempered materials that must be formed after heat treating can also be worked to accurate dimensions with it.

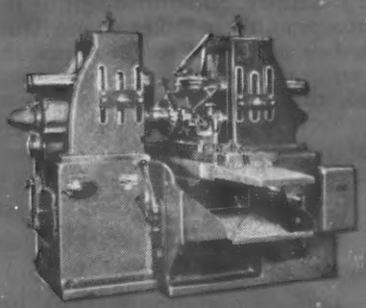
Flexibility built into each unit makes it adaptable for testing and determining ductile qualities of a wide variety of alloys and substances. It is also adapt-

"WHEN YOU PUT IT ON A *Milwaukee*"

YOU KNOW IT WILL BE MILLED WITH SPEED, PRECISION, PROFIT



The straddle milling operation on this 1236 Milwaukee Duplex Milling Machine requires flexibility in spindle positioning because the milling cuts are at different levels.... Independent spindle speeds are necessary because the job required the use of two diameters of cutters. . . . "Anchoring" the spindle quill with the quill support mounted on the overarms, insures vibration-free operation in either "out" or "in" position.



1800 Series Milwaukee Duplex Milling Machine

KNOWN as "production type" machines the Milwaukee Duplex series of milling machines offer important advantages:

— automatic trip table mechanism provides for continuous cycles of table movement.

— adjustable nut for *climb milling* eliminates backlash in the table feed screw. This feature permits machining a workpiece ordinarily difficult to hold for milling operations — results in increased feeds, improved finishes — anchored quill construction securely supports the quill behind the spindle nose in all positions.

These features plus the compact rigidity and sturdiness designed and built into the machine assure fast, precision production at less cost. Write for new Bulletin No. B20, giving complete details on the Milwaukee Duplex and Simplex Series of Milling Machines.

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Milwaukee Machine Tools

"Our 11 BAKER TRUCKS *have given us* CONTINUOUS 24-HOUR SERVICE for 4 YEARS"

CASE HISTORY OF THE THOMPSON AIRCRAFT PRODUCTS COMPANY

Routine periodic inspection and lubrication pays substantial dividends in the operation of Baker Trucks at Thompson Aircraft Products Company's mammoth new Cleveland plant.

Here is a good example of what can be expected of Baker Trucks in the way of *continuous operation,* when properly cared for. According to N. J. Shibley, Superintendent of Building and Property Maintenance at Thompson, their Baker Crane Truck and ten Baker Fork Trucks are as good as new after serving three shifts per day for nearly four years —the equivalent of 12 years of normal service. No truck has been overhauled, there have been only a few minor mechanical failures, and maintenance has been almost negligible.

Actual time out of service averages less than ½ hour per day, per truck, divided as follows:

Daily check of Hydraulic System	5 min.
Battery changes (2 min. each shift)	6 min.
Weekly lubrication (45 min.)—per day . . .	7 min.
Other maintenance (Tires, brakes, inspection and adjustment of electrical controls, etc.) 45 hours per month for 11 trucks—per day	10 min.
Total .	28 min.

Except for the above and for a ten minute period between shifts when trucks are idle, they have been giving "round-the-clock" service for four years and, says Mr. Shibley, "if we continue to take good care of them, they should last indefinitely." That's *Continuity!*

To help you keep your Baker trucks operating continuously and to insure long life, write for "Industrial Truck Care Pays You Dividends."

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
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Baker INDUSTRIAL TRUCKS

able for almost unlimited range of laboratory and experimental research work, preparatory to selecting proper materials and developing the design of experimental or finished working models.

All contact surfaces of the brake are completely adjustable in all planes and angles, making it possible to obtain a true radius over the entire material width at the point of forming, regardless of the degree of angularity, within the capacity

of the unit, on any bend or type of material being worked.

Precision adjustable stops are provided for holding to die tolerances the degree of angularity in all duplicated work. Adjustable bolts are provided with lock screws. Main bearings are of cold rolled steel to gray iron, adjustable for wear and alignment.

Portable Desk

Adaptable for shop foremen, shipping clerks, inspectors, dispatchers and others, a new portable desk with a multiplicity of industrial uses is being marketed by Lyon Metal Products Inc., Aurora, Ill. Model No. 2131-15, shown here, stands on 3 in. swivel casters and has a positive brake attachment. Overall size of

the unit is 34½ in. wide, 30 in. deep and 53 in. high. The desk hood provides adequate space for the storage of working papers. It has a smooth 30 in. desk top, with a 3 in. overall slope. The 24 x 28 x 3½ in. drawer is equipped with a lock.

H.Q.
FOR SMALL WHEELS

Whether you turn out fighting equipment for Uncle Sam or are re-tooling for peacetime production, you'll find Chicago Wheels just what you've been looking for to produce better, smoother finishes. The widest range of types, abrasives and bonds — wheels to do any job of grinding so accurately the finish can be measured in micro inches — rubber wheels for polishing or precision cut-off work.

You get the results of half a century of invention, tests and improvements from our modern research laboratory. And, this same laboratory is open to you — tell us about any grinding problem you have and our engineers will tell you how best to whip it.

GRINDING WHEELS up to 3" in diameter in various bonds, including the new FV, the bond with a pedigree.

MOUNTED WHEELS in every practical shape, grain and grade, each firmly mounted on a steel shank.

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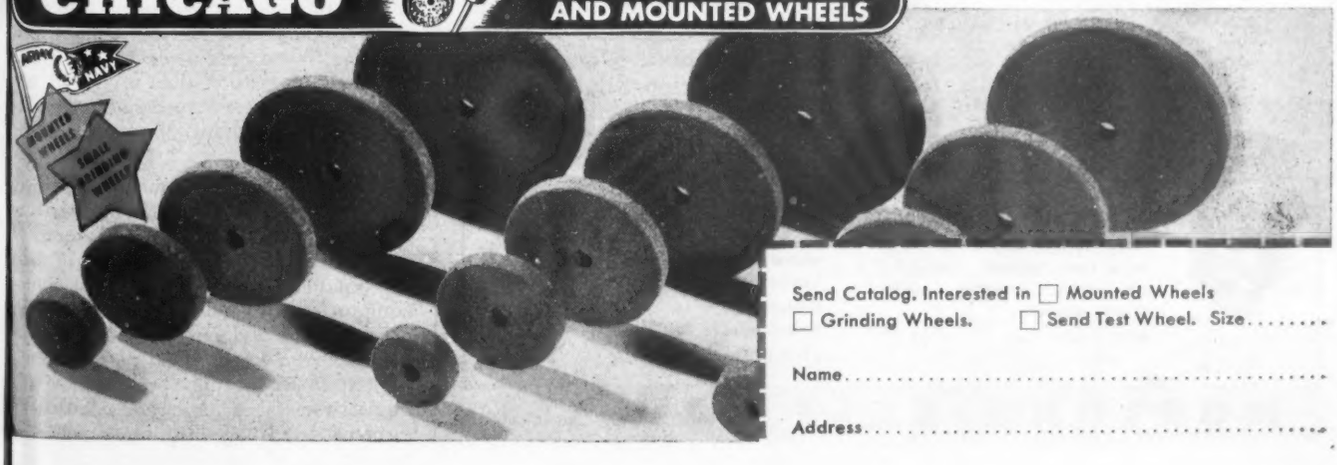

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It's easy to remember the time when only one plant in twenty dispensed salt tablets to employees who sweat. Today, virtually all of the country's leading manufacturers provide them continuously.

Sweat robs the body of vital salt . . . causes Heat-Fag, inalertness, heat prostration. Workers become tired, easily fatigued. Accidents rise. Production drops.

Salt Tablets are the simple, easy way to replace this salt lost through sweat. An Industrial "must", they are a safeguard against fatigue, an aid to production, a builder of employee health and morale. The cost is less than a cent a man per week to have them available at every drinking fountain.

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MORTON'S DISPENSERS

They deliver salt tablets, one at a time, quickly, cleanly—no waste. Sanitary, easily filled, durable.

800 Tablet size - - $3.25

MORTON'S SALT TABLETS

Morton's Salt Tablets are available either plain or with dextrose.

Case of 9,000, 10-grain salt tablets - - - - - - - $2.60

Salt Dextrose Tablets, case of 9,000 - - - - - $3.15

MORTON'S SALT TABLETS

Checks Steel Analyses

(*Continued from Page* 122)

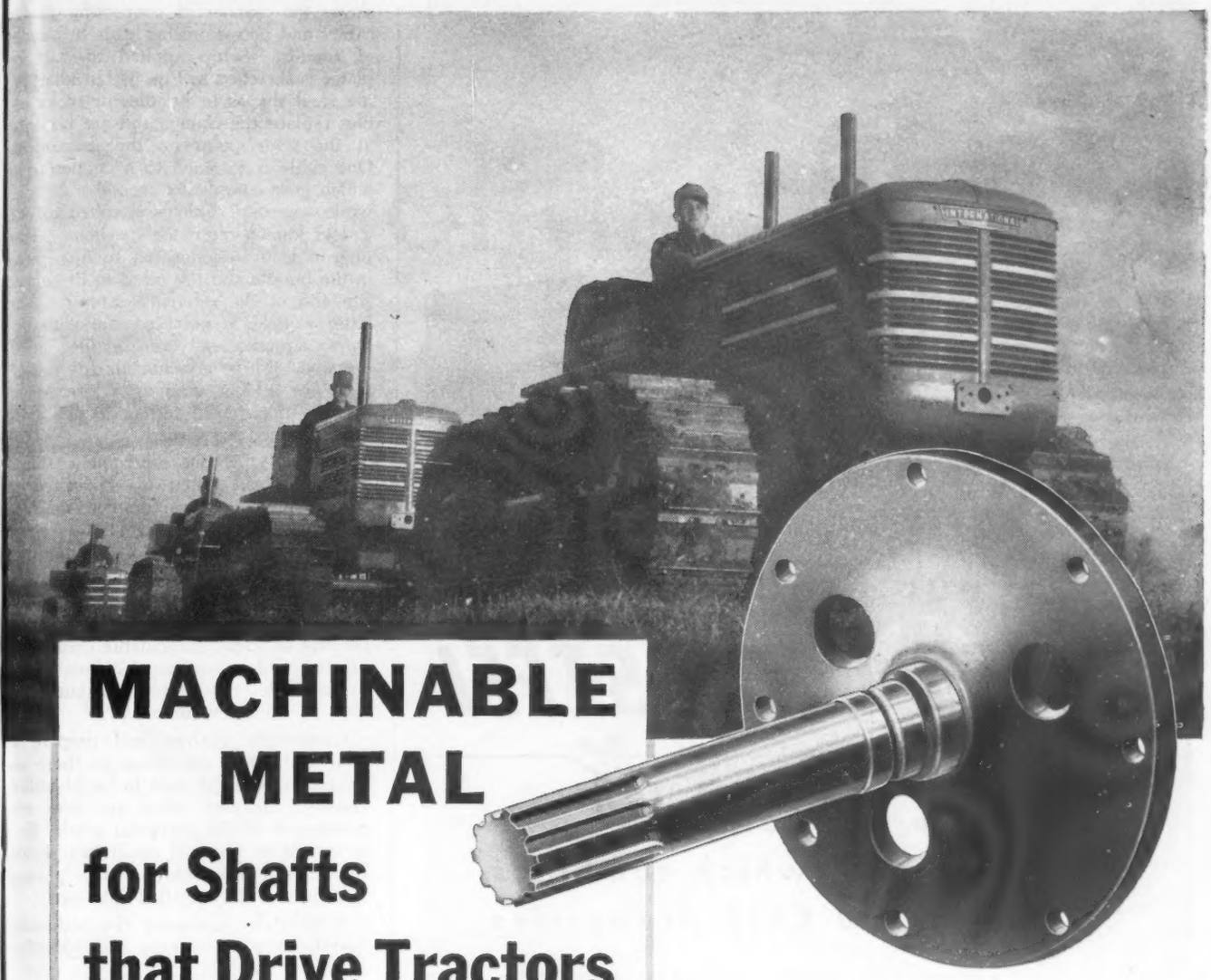
it nevertheless serves to render both specimens alike as regards physical structure regardless of what their previous structure may have been, providing chemical compositions are similar). This is not recommended for all grades of steel, inasmuch as any heat treatment which will equalize physical properties of the two specimens to be compared may be employed. Although the small difference which may exist in steel specimens due to heat treatment or physical structure will cause a thermoelectric reading on the instrument, this deflection will not exceed the permissible tolerance.

When one specimen has been used repeatedly for several consecutive tests, especially if it is of small diameter, contact with other specimens over a previously used point of contact is to be avoided. This may be noted by presence of small fusion spots; under standard power requirements, such fusion naturally does not take place with bars of larger size and greater cross-sectional area. When too many of these spots are present on a bar, it is turned down in a lathe or ground. Turning or grinding to a depth of 10 or 15,000th-in. will recondition it for further use.

At junction point of two specimens, they should have approximately similar shape at the surface, i.e., sharp edge should meet sharp edge, or curved surface should meet curved surface. Correct method for presentation of these curved surfaces is illustrated in Fig. 3. By observing this point, a difference in shapes or sizes of specimens will have no effect on authenticity of the instrument indication. Also differences in mass thermo-conductivity caused by dissimilarity in contour—a sharp edge or corner retaining temperature longer than a curved or blunt surface—are somewhat equalized. If one round specimen is to be compared with another which is flat, rectangular or square, the sharp edges are rounded off by grinding or filing until a radius of about ⅛ to ¼-in. has been formed on the flat or bar. This is necessary only at the junction point.

One other rule which is observed at White is that when testing bars smaller than ⅜-in. diameter or specimens having less than 0.1-sq. in. cross sectional area, a reference specimen of the same cross sectional area as the unknown is chosen. When specimens having cross-sectional area greater than 0.1-sq. in. are compared, reference specimen may differ from the unknown to any extent as regards size.

In addition to equipment described, extension cables and attachments are available for making tests in the mill or plant of pieces either singly or of bars in bundles. The instrument comes equipped with one pair of extension power cables and one pair of extension potentiometer leads which permit identification of all of the various sizes and grades previously described, but at a distance from the instrument. Fig. 3



MACHINABLE METAL for Shafts that Drive Tractors

TAKE this sprocket drive pinion shaft. It transmits power from the transmission to the tracks of an International Crawler Tractor. It must be tough and durable to stand up under the strain of tractor operation and yet it must be machined to close tolerances. A tough production problem?

Not for Sulphite-Treated Steel.

Here is a metal that sacrifices nothing in strength and durability but is far more machinable than ordinary steel of equal strength. It is successfully used in all kinds of products, from crankshafts to shells. In every case machining operations are made easier, faster and at lower cost. Tool life is increased as much as 200%, saving both time and labor.

Your product may be one more application for this machinable steel. Let our sales and metallurgical staffs investigate the possibilities of solving your production problem with Sulphite-Treated Steel.

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SPEED CASE STEEL

There in no other ONE STEEL which combines all SPEED CASE properties

The Machinability, Ductility, and Tool Saving qualities of SPEED CASE STEEL are only three of the properties of this revolutionary steel which are making past production records obsolete. In many plants it eliminates one or more operations in annealing and finishing. In others it is being deformed cold instead of after heating. Tool life is usually doubled and savings up to $70 per ton used are the rule, not the exception. Why carry a large inventory of different steels when ONE STEEL—SPEED CASE—will satisfactorially replace all other low carbon and Bessemer steels.

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MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

shows the manner of connecting power cables and potentiometer leads to bundle of rounds. Setup applied to flats or plates is sketched in Fig. 5. In identifying steel shapes in bundles or racks cables replace the clamps and are fastened at the same point on the instrument. One cable is fastened to a copper strap which goes completely around a bundle, while a second cable is attached to one end of known reference specimen. One plug-in lead is connected to any piece in the bundle and the other to the opposite end of the reference sample. The latter is held in point contact with unknown pieces in the bundle being checked. These attachments for remote tests are seldom used at White Motor because the special testing fixture obviates the need for them.

Portability of the instrument stands in good stead when it is desired to identify members of a complete machine or structure.

Preceding paragraphs have described the method for making identifications as well as outlining correct operation of the instrument. Yet to avoid confusion because of some unavoidable conflicts in practice under exceptional circumstances, recommended procedure for making these tests is briefly summarized:

Chemically analyze and prepare as many reference specimens as there are grades or types of steel to be identified, choosing analyses which are most representative of the particular grade. Heat treatment or physical conditions should, for close results, conform with physical structures of the so-called unknown.

Proceed by operating the instrument exactly as when making heat identification, except that one of the preselected samples will constitute the unknown. Power control is set at zero position and test time limited to 1 sec; the polarity and magnitude of deflection of each possible combination of specimens is noted and record of the results is incorporated in table similar to accompanying table.

TESTS MADE AGAINST VARIOUS REFERENCE SPECIMENS

Specimen	A	B	C	D	E
A	0	5+	9+	14+	49+
B	—5	0	17+	20+	30+
C	—9	—17	0	25+	35+
D	—14	—20	—25	0	42+
E	—49	—30	—35	—42	0

Power Setting, "0"—Time, 1 Sec.

If some combinations produce deflection exceeding the limit of calibration, reduce the amount of testing power, i.e. to 1, 2, 3, 4 or 5 setting until excessive deflections become measurable. If deflections produced by all combinations remain within the scope of calibrated scale, the magnitude and polarity of the deflection resulting from testing of an unknown will be the identifying indication of that particular grade of steel. When a certain combination of two specimens

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LIKE ADDING ANOTHER FINISHING DEPARTMENT

With high-solids lacquers providing coatings of twice the usual thickness, finishing departments can turn out far more work with no increase in space, manpower, or equipment. Each coat now does the work of two! Higher percentages of lower-viscosity nitrocellulose have made this possible. Increased thickness and protection are noticeable only after drying. Investigate high-solids lacquers now . . . for high-speed finishing of metal, wood, fabric, rubber, leather, paper, plastics . . . and see what time and money you can save.

ASK YOUR LACQUER SUPPLIER for complete details and application data on these new time-and-money-saving lacquers, as they become available. Hercules does not make high-solids lacquers, but concentrates on the production of the highest quality nitrocellulose from which they are made.

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If you want to see grinding and finishing costs hit bed-rock, try using GRIT-LOK Bond 3-M Abrasive Belts and Segment Face Contact Wheels on a backstand idler. On practically any type of work, this set-up produces smoother finishes on curved or flat surfaces. The fast cut of 3-M Abrasive Belts gives you speed to spare. Yet, for all their cutting speed, they wear longer because new GRIT-LOK Bond 3-M Abrasive Belts are TOUGH, RUGGED and COOL RUNNING. They give extra hours of service on every grinding job. Their uniform abrasive coating produces finishes that require a minimum of polishing. GRIT-LOK Bond 3-M Abrasive Belts are available in a wide range of grits to meet any requirement. Order them by trade name from any distributor of 3-M PRODUCTS.

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produces a deflection exceeding the limit of the calibrated scale, even at a testing time of 1 sec and power setting of 5, it is necessary to find a reference piece which is more like or similar to the grade of the unknown. Deflection then will remain within the scale.

As he becomes more experienced, an operator learns that it is necessary only to be able to distinguish among a few, five or six, different grades of steel in any one department of a plant. To do this, a reference specimen can be found which will segregate grades in question into clearly defined groupings. After such readings have been established for any one power control setting and test time duration, a strip of tape may be marked to correspond with the deflection for these grades, using the SAE, NE, or type numbers instead of figures on the calibrated scale. The tape then can be placed along the bottom of the calibrated scale on the instrument to facilitate in identifying a number of grades without having to refer to the table of deflections.

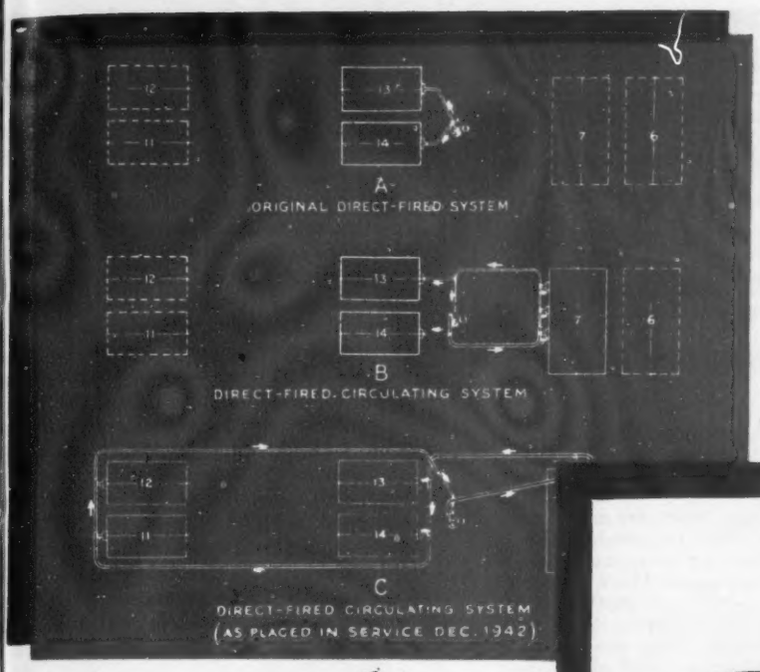
Advantages Claimed for Selenium Power Rectifiers

Selenium power rectifier for converting ac to dc on large aircraft has several advantages, according to A. L. Embry, design engineer at General Electric's Lynn River Works. It does not have high voltage drop of an electronic tube nor the moving parts and brushes of a rotating machine. It is simple, reliable, and easy to maintain. For three-phase power input, it can be designed for 85 per cent efficiency. Weight of a complete unit, including transformer and voltage regulating equipment, compares with that of a motor-generator set of the same rating.

Selenium rectifiers can be used with transformers to obtain almost any desired output voltage. Input may be single phase or polyphase. Widest present application is for 28.5-v dc units with three-phase input. Also, for some applications where direct current load is substantially constant, selenium rectifiers may be used without voltage regulation. Rectifiers may be designed to operate directly from alternating current line or with a suitable transformer to provide desired current voltage. Variations in direct current voltage will be only slightly greater than those of the system alternating current voltage, according to Mr. Embry.

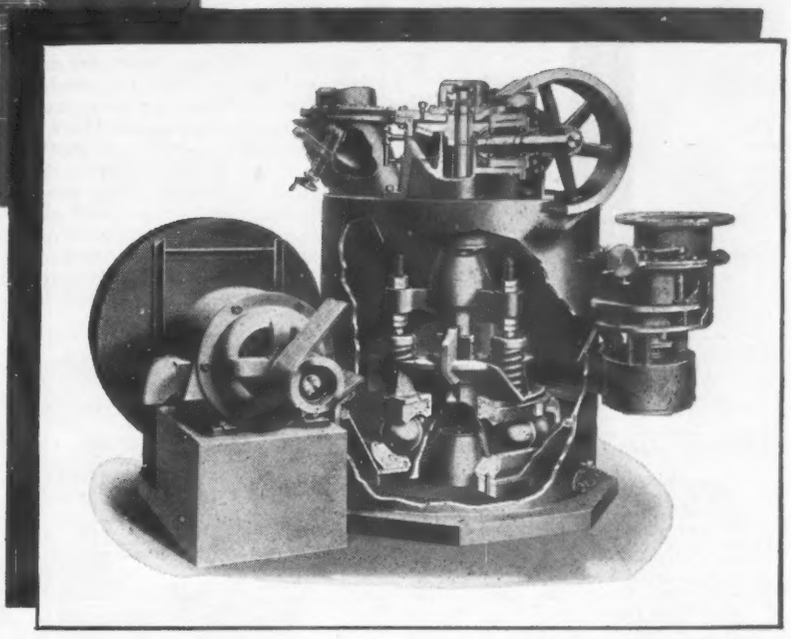
—o—

A reference chart for welders, pointing out proper shades of filter lenses for different types of welding operations, is available from American Optical Co., Southbridge, Mass. Chart is said to help simplify and speed up work as well as to guard eyesight. Shades for electric welding are classified according to different diameters of welding rods, and consideration also is given to use of carbon, helium and atomic hydrogen arcs.



SAVINGS START HERE

with the B&W Direct-Firing Pulverized-Coal Circulating System



Cutaway view of B&W Type B Pulverizer

Substantial savings in installation, operating, and maintenance costs over other methods of firing metallurgical furnaces are made possible by the B&W Direct-Firing Pulverized-Coal Circulating System. A single pipe looped overhead and around several furnaces supplies air-borne pulverized coal of proper fineness to as many burners as are required for the service. Automatic control provides the same flexibility as obtained with oil or gas. With this method of firing, only ONE pulverizer is needed. It can be set where convenient; saving floor space and eliminating interference with product handling at the furnaces.

With this system you save fuel, reduce heating cycle time, and increase production. These savings begin at the heart of the system—the B&W Type B Pulverizer. Fuel distribution and capacity of the system, whether for single or multiple furnace operations, is assured because the Type B Pulverizer is built to stay on the job and to pulverize its rated capacity in coal to the fineness necessary for the specific requirements of each installation. This pulverizer is of the same type as that widely used for firing boilers and cement kilns, where sustained fineness and capacity of product and continuous low-cost operation are governing factors. They assure the same dependable service in this simplified method of firing metallurgical furnaces.

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PM-105

THE BABCOCK & WILCOX CO. 85 LIBERTY STREET, NEW YORK 6, N. Y.

REDUCE HEAT-TREATING COSTS

SPEED PRODUCTION with *Quick Acting* JOHNSON Furnaces

No. 130A Hi-Speed Steel Heat-Treating Furnace

Firebox 7¾" high 13" wide 16½" long

FOR quick, accurate heat-treating of high-speed steels, dies and tools Gets the job done before conventional type furnace heats up. 4-Burner Unit shown for temperatures 1400° to 2000°F. 6-Burner Unit for temperatures 1800° to 2400°F. Counterbalanced door opens upwards so tools may be inserted or withdrawn without fully opening door. Firebox lined with high temperature insulating refractory. Complete with Carbofrax hearth, G.E. motor and Johnson blower

4-Burner . . . $295

6-Burner . . . $325

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This efficient Johnson Furnace reaches 2250°F. in 30 minutes, is low in original cost and inexpensive to operate. Designed primarily for heat-treating high-speed steels, it is equally efficient for hardening dies, punches and cutting tools of high carbon steel. Firebox 5" high x 7¾" wide x 9" long, lined with high temperature insulating refractory. Furnished complete with Carbofrax hearth, G.E. motor and Johnson blower.

ORDER TODAY!

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Designed for low temperature salts and liquid baths, this New Johnson furnace provides easy control of 200 to 1150°F. to handle a wide range of jobs. Fired by powerful, flexible Johnson concentric ring burners with wide turn-down range. Economical to operate. Lined with high grade insulating refractory and equipped with 14" x 20" pressed steel pot. Also available with 10" x 14" or 10" x 12" pots.

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573 E. Ave. N.W., Cedar Rapids, Iowa

Please send me Free Illustrated Catalog of Johnson Quick Acting Furnaces.

Name_____

Address_____

City_____ State_____

Controlling Quality

(*Continued from Page* 124)

plete and thorough inspection of the part or assembled equipment. This inspection goes beyond the specifications or tolerances applying to the part at this particular stage of production. The inspection at this point includes all features of quality affecting the part, such as kind and grade of material used, condition of burrs on cut or sheared edges, condition of machined surfaces to determine whether they are sufficiently smooth or not, hardness of material where this can be determined, general appearance of the parts or assembled item, and complete compliance with drawing or specification requirements. This is essentially a bench inspection, and the inspector must be equipped with the tools required for performing this inspection.

By this method, dimensions on blanked and formed parts produced on punch presses are being held to within 0.001-in. regularly.

Machines Are Tagged

If the inspector is satisfied that parts or assemblies are within the required specifications, and that the process or machine itself is in such condition as to continue to produce good parts, he makes out an operation inspection tag. Here he records the part number, the shop order, and the name of the operation. He also describes briefly the material being used and any peculiarities of the material. The inspector also shows the time and date of this first piece inspection, and the shop section in which the operation is being performed.

The tag, properly made out, and the piece which has been approved, are both returned to the operator as his authority for proceeding with the operation. The tag must be prominently displayed at the machine or work area, where the operation is being performed. No operation is allowed to run unless this tag is shown except while the machine is being set up or adjusted.

After the operation has been in process for some time, and at the discretion of the inspector, he visits the machine or work area to determine whether manufacturing conditions are still satisfactory for the production of parts or assemblies of the required quality. When the inspector approaches the operation, he stands back and observes general working conditions. He notes first whether the machine is properly lubricated, clean, and in good general working condition. He notes whether the operator is subject to excess fatigue, poor ventilating or lighting conditions, or whether or not parts are being placed in suitable containers. He notes whether the scrap is being properly taken care of, or whether it is allowed to fall on the floor, creating an accident hazard.

All of these factors affect the operator's peace of mind and general morale, and contribute substantially to the production of a proper standard of quality.

If these general conditions are satisfactory, the inspector proceeds to inspect

TWA Constellation by Lockheed

DESIGNED FOR PEACE, DRAFTED FOR WAR. That's the story of the Constellation. Originally planned for TWA . . . for new luxurious, five-mile-a-minute cross-continent service . . . these super air liners joined the Army Air Force instead . . . carrying not 57 passengers in deep-cushioned chairs but providing sterner accommodations for 100 fully armed soldiers.

But when the war is over, the Constellation will return to the job awaiting it . . . that of carrying mail, passengers and express over the TWA system.

And when the war is over, many of the remarkable developments contributing to military aviation again will be ready to serve in other fields. PESCO design and manufacturing experience in meeting the exacting demands of military aviation will be available not only to commercial aviation, but also to industry in expanded and more effective industrial applications of Pressurized Power and Liquid Flow. For descriptive literature, write PESCO Products Co., division of Borg-Warner, 11610 Euclid Avenue, Cleveland 6, Ohio.

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PERFORMANCE POINTS TO *Pesco* FIRST

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NOZZLES
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PISTON PARTS
PLUNGERS
PUMP PARTS
RATCHETS
RETAINING RINGS
ROCKERS
SHACKLE BOLTS
SHAFTS
SOCKETS
SPINDLES
STEERING WORMS
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TEXTILE GUIDES
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VALVES AND SEATS
WIRE DRAW PLATES
WRIST PINS
YOKE NUTS
DIESEL ENGINE FUEL INJECTOR PUMP PARTS

HERE ARE a few of the successful applications of Nitralloy from our constantly growing Case-History files.

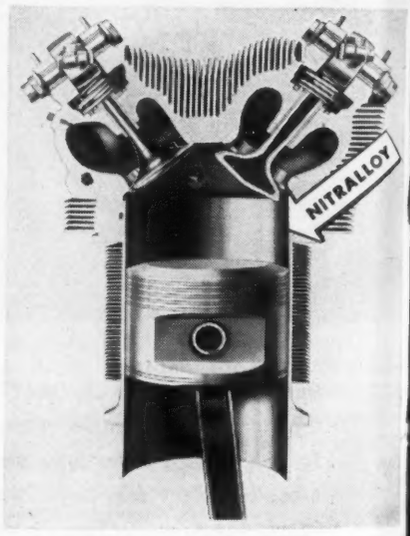
Wherever sapphire-hardness and high fatigue resistance are required ... wherever steel moves against steel under conditions inviting lubrication failure — wherever parts must retain their hardness at 750°F. —that's where Nitralloy is indicated.

If all or any of these Nitralloy properties will improve your product, it will pay you to specify and use Nitrided Nitralloy — the hardest steel surface known.

Nitriding is the process of case hardening certain alloy steels by means of a nitrogenous medium such as ammonia gas. The alloy steels that are most suitable for Nitriding are known as Nitralloy.

Write on your business letterhead for the 40-page booklet "Nitralloy."

Find out what NITRIDED NITRALLOY *can do to extend the life and dependability of your peacetime machinery. Send us your specifications. Our applications engineers will study them and submit recommendations—for your use in planning Victory products. Or just ask for booklet—no obligation to you either way.*



Where surfaces must have extreme hardness to resist wear, Nitrided Nitralloy is the logical choice. Here Nitralloy protects engine cylinder barrels.

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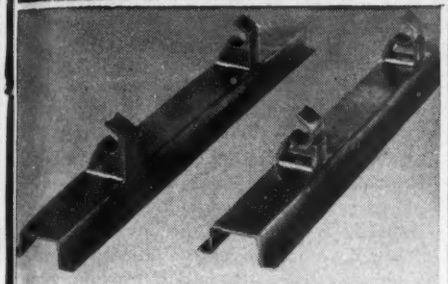
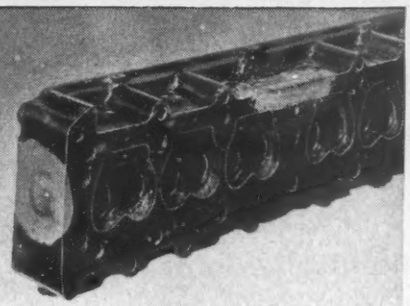
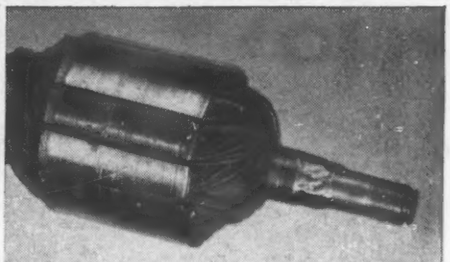
AVOID WELDING DISTORTION STRESSES AND OVERHEATING



Arc welding bombsight hanger on frame member of plane produced severe warping and misalignment. Eutectic Low Temperature Welding prevented distortion and formed strong joints.



Cast iron motor heads are safely repaired without danger of subjecting to stresses, eliminating need for costly and lengthy after machining always necessary to correct distortions.



Worn motor armature shaft resurfaced by Eutectic Low Temperature Welding completely avoiding warping of shaft and preventing destruction of windings by excessive heat.

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very day—
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hat can be
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Bond metals at temperatures as low as 340° F. Reduce heat consumption . . . cut welding costs

Now, without resorting to high temperatures, you can gain the advantage of the strong bonds formed by fusion welding.

The most revolutionary welding development of modern times—EUTECTIC *Low Temperature* Welding enables you to join metals at temperatures below the fusion points of base metals.

Eutectic welding rods and fluxes are available for joining all metals by means of gas—arc—induction—furnace and all standard methods of heating.

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☐ Send me full information for purchasing *introductory assortment* of important Eutecrods for Production Salvage and Maintenance welding.

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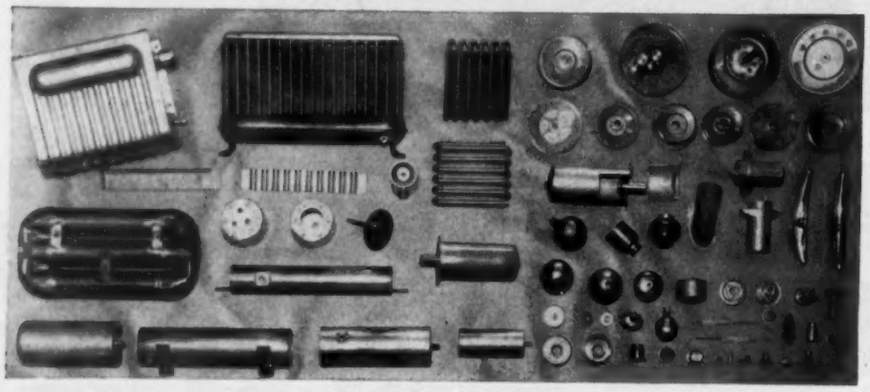
Company_____ Address_____



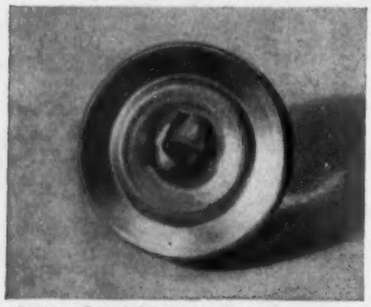
Some parts being joined in EF brazing and soldering furnaces. Products ranging from small metal radio tubes up to large automotive and refrigerator units are joined neatly, securely and economically by this process.

Aluminum, Brass, Steel and Other Assemblies

Are Securely & Economically Joined

In EF Soldering and Brazing Furnaces

Products difficult or expensive to make in one piece can be made in several pieces and joined. Products requiring several stampings joined or requiring screw machine parts, forgings and stampings to complete the unit, can be neatly, and economically joined right in your production line. Strong, leak-proof joints are made and the completed units are discharged from the furnace—clean and bright. Any number of joints in the same product or any number of pieces can be joined at one time.



Result of a laboratory test on an automobile fan pulley in which the hub was brazed to the web. The complete pulley was placed in a press and pressure applied. The steel web broke but the brazed joint held securely.

Investigate EF Furnaces for Joining Your Metal Parts

Send for printed matter showing various types of EF brazing furnaces.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

FURNACES OIL, GAS or ELECTRIC

For Every Heating and Heat Treating Process

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We Build the Furnace to Fit Your Job

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SALEM, OHIO

one or more pieces, to satisfy himself that these are of substantially the same quality as those checked at the time of first piece inspection. It is important that he inspect parts made while he is at the machine and not those parts which have been produced 15 min or ½-hr previously, because conditions might have changed and he is interested in conditions as they are now.

Whether he looks at one part or a dozen depends on how much information he requires to satisfy himself that the general process is satisfactory. He might also wish to inspect a few parts made some time previous to his arrival at the work area, to note whether or not there is some gradual change taking place in the tools.

If he finds conditions satisfactory and parts are being produced within the required specification, he notes on the Operation Inspection Tag the time of his inspection and the approximate number of pieces which have been produced since the beginning of the operation. This count may be conveniently taken from a Veeder counter attached to the machine when possible.

Tag Records Production

On one job, the inspector performed six such patrol inspections, averaging two inspections a day—one in the morning and one in the afternoon. The tag shows that the process had produced 7690 parts, it shows when the last part produced was approved. It also shows that the tool—in this case a die—requires regrinding before another run is started.

The tag is simple in form, easily understood by the foremen and operators, and gives a complete history of the running of the job.

If at any time during one of his patrol inspections, the inspector finds the process producing defective parts, he merely lifts the Operation Inspection Tag, which automatically informs the operator that he must make adjustments to the process or machine. This literally stops the operation, and it is then the foreman's responsibility to get conditions corrected before the inspector will approve the operation for further production.

It has been found that by the application of the principles of first piece and patrol inspection, the control of quality of parts can be so effective that parts can be put into assembly lines without any further inspection.

On the assembly line, quality is controlled by the inspector "patrolling the line," although he does not go through the formality of using an Operation Inspection Tag. By patrolling the line, he observes which operators perform operations satisfactorily and which operators need instruction or are careless. All assembled equipment receives a thorough electrical test, to determine the proper operating characteristics. However, a thorough patrolling of the assembly lines assures a minimum of rejects.

One important feature which is ordinarily lost sight of is the checking on the inspector. It is generally assumed that the inspector makes no mistakes. How-

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Plate and Squaring Shears

7 SIZE SERIES

For Mild Steel Up to 1¾" and Lengths to 13 Feet

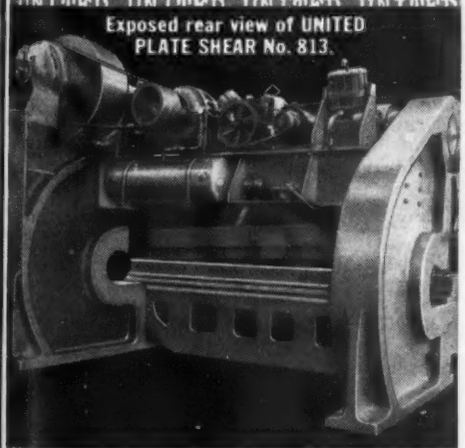
UNITED PLATE SHEAR No. 813, knife pressure 640,000 lbs., for 1 9/16 inch mild steel 156 inches wide.

Illustrated is UNITED PLATE SHEAR No. 813, with a rate knife pressure of 640,000 pounds, capable of shearing 1 9/16 inch mild steel plate 156 inches wide.

Drive is through cone worm gears and V-belts, a greatly improved method of driving a shear. Plate holddown, or gags, air operated from a self-contained system, are arranged to afford operators the best possible vision when lining up plates for either cutting or slitting. Top knife head is air balanced from an independent, self-contained system providing constant balance at all times. Design of the bottom knife head provides means for easily catching plates permitting them to be moved or inched along as required.

This shear has recently been redesigned to improve its operating characteristics and greatly reduce its overall size. It is typical of the general design of our complete line of PLATE and SQUARING SHEARS. Rugged, simple construction, quiet, easy operation and low maintenance are notable features.

Write for detailed specifications. Our engineers will gladly recommend the right shear for your individual requirement.



Exposed rear view of UNITED PLATE SHEAR No. 813.

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. . . was engineered and designed for efficient extrusion of bars, rods, all types of sections, wire rods and strip from aluminum, magnesium, copper and steel alloy billets.

The metal is shaped to highly accurate dimensions. Each press is built to endure extreme runs of tonnages and hours at low operating and maintenance costs.

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HYDRAULIC PRESSES • ROLLING MILL MACHINERY

ever, in a thorough quality control program, provision must be made for "inspecting the inspector."

Accordingly an inspection supervisor checks the inspector's work. This supervisor inspects equipment which has been packed and is ready for shipment. First he inspects the carton and method of packing. He then opens the carton and reinspects the equipment to assure himself that the customer is actually getting what he is paying for. He then takes the equipment back to the test station and subjects it to a thorough electrical test, as a check on the test operation.

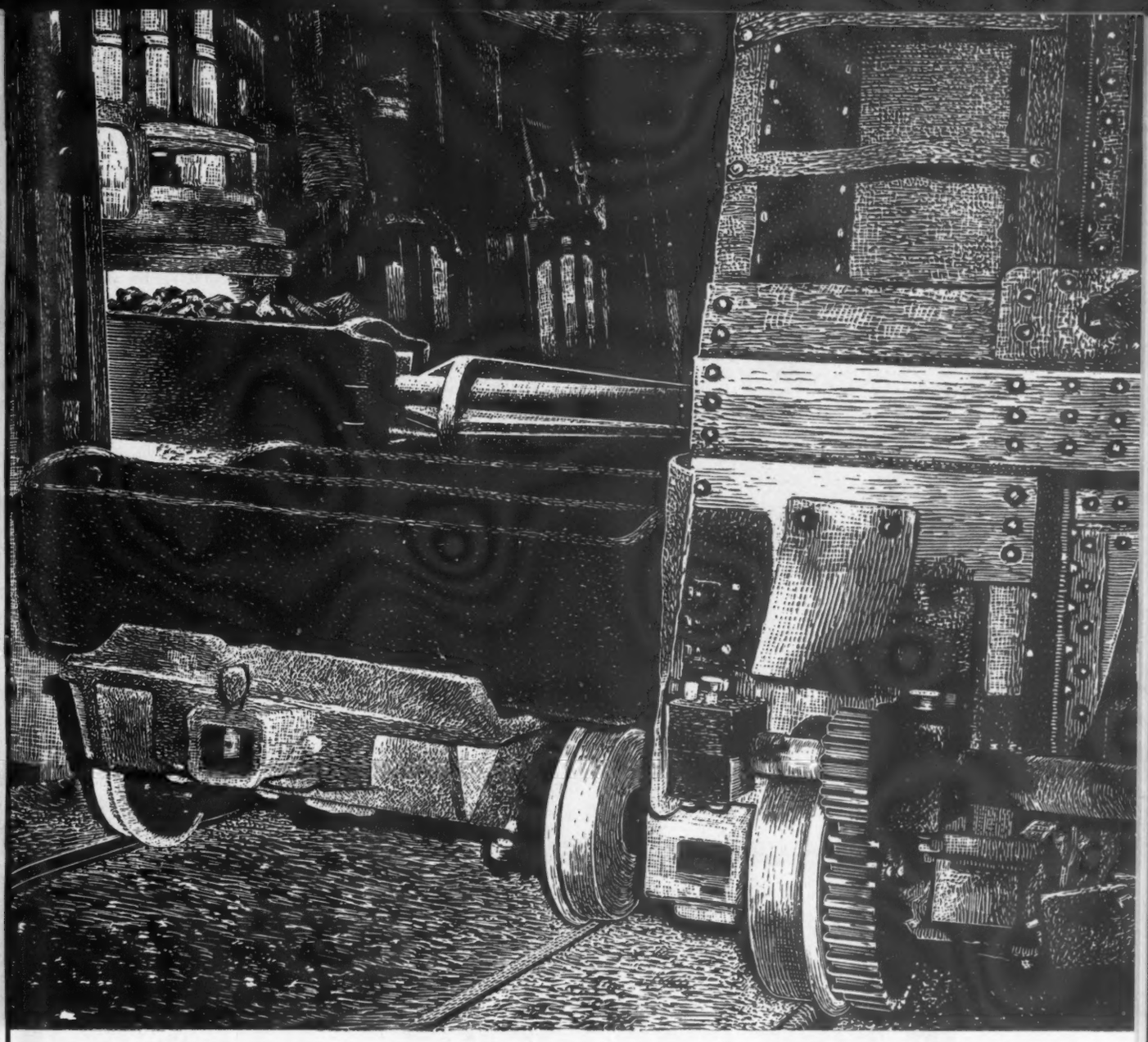
These checks, or reinspections, sometimes are rather elaborate. In the case of equipment like refrigerators, electric ranges and water heaters, complete and thoroughly equipped electrical laboratories, staffed by graduate engineers, are used. Merchandise is brought back from the warehouse, having been picked at random, and put through its paces in the Quality Control Laboratory, to discover any weaknesses that might have been overlooked by the regular quality control organization during production, and also to discover inherent design weaknesses.

The program for controlling quality described here might appear rather elaborate. However, there is no substitute for quality, and the responsibility for building a quality product must be at all times placed at the door of the manufacturing people. Truly, *Quality Must Be Built Into A Product, It Cannot Be Inspected Into It.*

Axle-Driven Generator Handles Heavy Loads

A new axle-driven generator has been developed by Westinghouse Electric Corp., Pittsburgh, Pa., to supply the necessary power to handle the load of electrical equipment anticipated in future railroad passenger cars, which may have such features as electrically refrigerated water coolers, electrostatic air cleaners, greatly increased lighting, and fluorescent lamps. A 76-v generator is planned to serve a 64-v car power system, the old 32-v system being inadequate for contemplated loads. Light weight and small size are achieved in part by high speed (4000 rpm at 120 mph, instead of 2400 rpm at 90 mph.) An ac motor is built into the generator frame to drive the generator when train is standing in terminals. The separate motor also permits testing of the system without moving the car.

To provide alternating current for fluorescent car lighting, a light-weight motor-generator set also has been developed. With a rating of 4 kw at 3600 rpm, it is no larger than the earlier 2 kw sets which ran at half that speed By a new arrangement of fields on the motor and generator, the company states that it is possible to hold the frequency between 58 and 62 cycles, and the voltage between 110 and 125 v for the variation in load and battery voltage that may be expected.



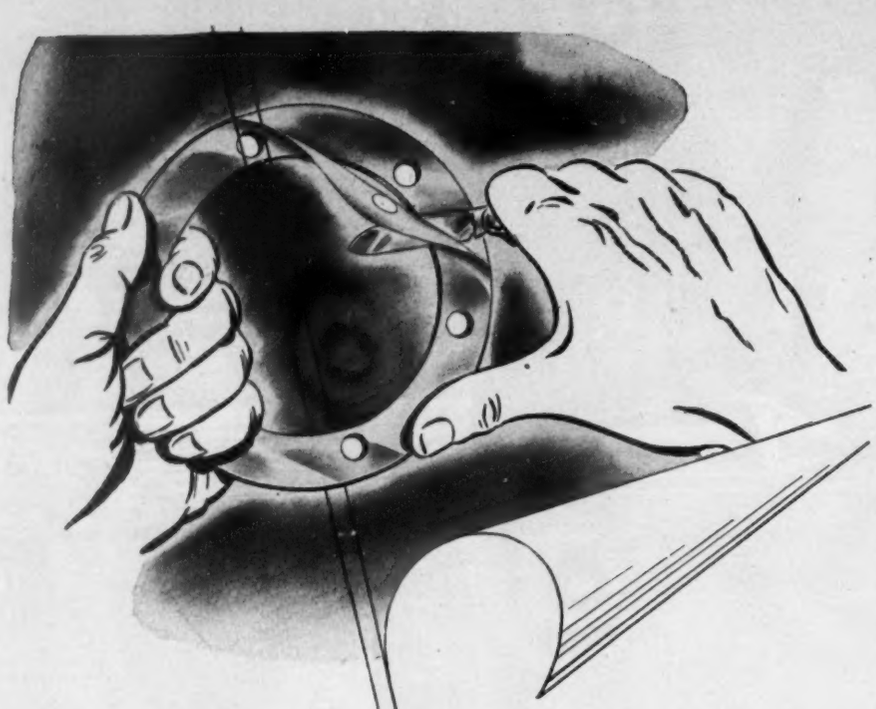
PUTTING HEAT-PROOF BRAWN *Into Peels!*

Charging peels, used to introduce scrap metal into blast furnaces, are subject to alternate periods of terrific heat and cooling, causing the charging ends to develop fire cracks. For this "business end" of the peel, a heat-and-wear resistant alloy steel is frequently specified; the remainder of the peel is made of mild steel. Thermit welding is used to join the two parts together.

Thermit welding is the favored welding process for this exacting assignment because the weld must be strong, permanent and stress-free. Thermit welding is readily adaptable for such heavy section jobs—an outstanding example being its use in fabricating stern frames for Liberty ships. It is also used extensively for repairing rolls, pinions, machine frames, crankshafts and other large parts—where the permanency of the weld and the economy of the process are decided advantages.

Thermit welding can be done in your own plant or at one of the Metal & Thermit plants at Jersey City, N. J., Pittsburgh, Chicago or South San Francisco. Write for full details to Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

Thermit Welding



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LAMINUM

THE SOLID SHIM THAT peels FOR ADJUSTMENT

Resistance Welding

(*Continued from Page* 125)

have also aided installation under these conditions.

Flash welding of heavy alloy steel sections is a recent extension of the range of resistance welding made possible by an automatic preheat and welding cycle for machines having up to 1000 kva capacity and 300,000 lb push-up pressure. These machines have capacity of 10 to 15 sq in. of the high alloy steels condensed welded area, and 25 to 30 sq in. for the mild steels. The total time per operation does not exceed 2 min.

The same method of variable heat and pressure application holds unlimited possibilities in spot, butt and flash welding of such dissimilar metals as those that require preheat preparation and annealing and those that require post-heat treatment. It is important to note that all these multiple stages or operations involving making the weld are done at the welding machines, under complete automatic control.

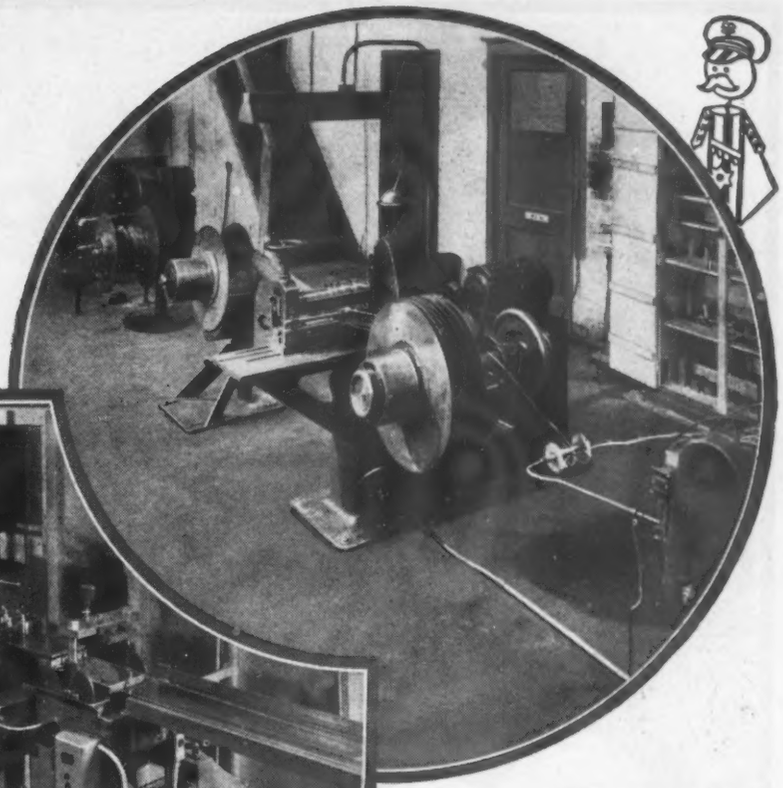
Recent Developments Resulting from General Improvement of Welding Machines: Heavy duty flash welding installations have greatly increased. This is due largely to improvements in the hydraulic pressure unit and control of such equipment. Absolute precision is assured for the platen movement during the flashing period and an explosive type of push-up has been developed. New hydraulic devices provide full manual control of the platen movement so essential to start the flashing, or to retard it, if too intense. At the same time, it provides full automatic control of the entire flashing and upset cycle of operation.

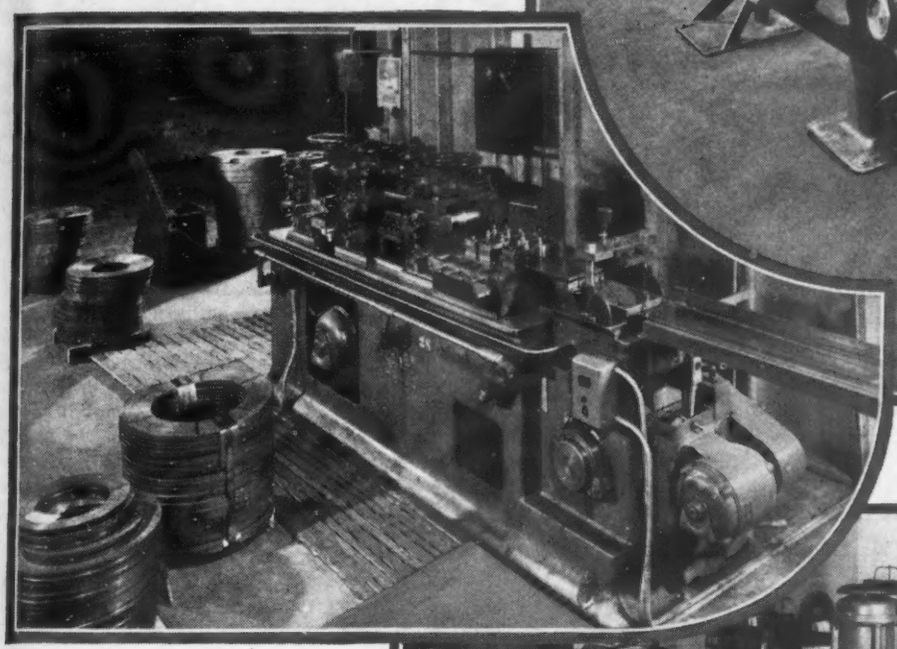
An unexpected advantage resulting from this fast acting pushup is a greatly reduced demand upon electrical power in the flash welding of aluminum and aluminum alloys. Sections of aluminum alloy with 4.5 sq in. of area have been welded using a 225 kva machine. This use of 50 kva per square inch compares favorably with and in some cases is lower than that required for steel. Stored energy equipment heretofore used only on aluminum fabrications can now be used on equal sections or thicknesses of steel, thus permitting installations of machines where sufficient single-phase power is not at present available.

Range of standard machines has been so increased that today "off-the-shelf equipment" is available for welding from the smallest articles, using as little as ½ oz. of welding pressure, to work for the heaviest hydraulically operated flash welder developing 300,000 lb pressure. This tremendously increases the opportunities on new methods of fabrication.

Recent Developments in Fixture Application: Increased production of small condenser boxes has been made necessary by their greatly extended use in radio and radar. These boxes must be square or rectangular in shape. The common method of assembly was be-

SHEARING
SLITTING
EDGING
SAWING

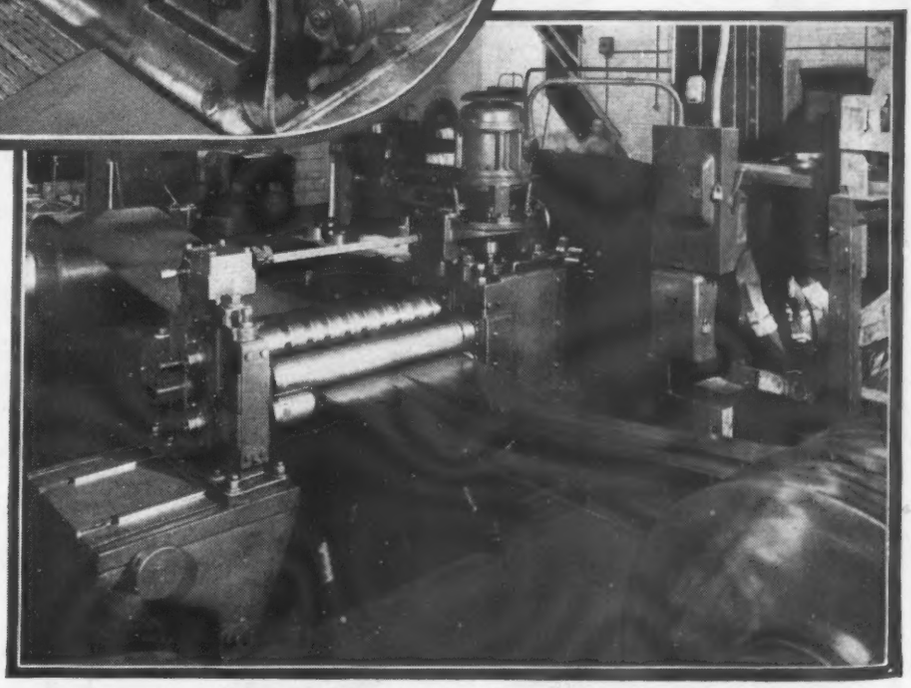




FLATTENING

IMMEDIATE WAREHOUSE SHIPMENTS

GENSCO



GENERAL STEEL WAREHOUSE CO. Inc.

CHICAGO 39, 1830 N. KOSTNER AVENUE, Belmont 4266

NEW YORK, 17	CINCINNATI, 2	MILWAUKEE, 8	ST. LOUIS, 12	MINNEAPOLIS, 11
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COLD FINISHED BARS • AIRCRAFT STRIP STEEL • COLD ROLLED STRIP STEEL • STEEL BALLS
COLD ROLLED SHIM STEEL • SHEET STEEL • ROUND EDGE FLAT WIRE • FEELER GAUGE
TEMPERED AND ANNEALED SPRING STEEL • ROUND WIRES • DRILL ROD

COME TO
PANGBORN
Blast cleaning, shot peening and dust control equipment is needed now—and will be needed in post-war production, too. Pangborn can help you—"come to Pangborn".
PANGBORN CORPORATION
World's Largest Manufacturer of Blast Cleaning and Dust Control Equipment
HAGERSTOWN, MARYLAND
★249

coming a very serious problem because of the growing shortage of trained help. Automatic resistance seam welding was the only process holding promise of meeting an exacting production schedule. It was not practicable to alter the shape of these boxes because of the limited available space in the final assembly. Problem was to maintain same welding speed and pressure around a corner for the top and bottom welds as that applied to the flat surface weld.

After considerable experimentation with wooden models, the difficulty was solved by using a seam welding wheel on the outside, revolving against a rotating mandrel, to which was applied a unique pressure device. By this method, required conditions were met and desired quantity of the item was produced within the time limit at a saving of over $60,000.

Developments Due to Research: From such sources as the American Welding Society, National Research Council, Resistance Welder Manufacturers' Association, American Institute of Electrical Engineers and American Standards Association have come contributions of useful new data and information of inestimable value on use and application of this art. Outstanding example is the approved adoption of spot welding for assembly of prime aircraft structures; spot and flash welding of high alloy and carbon steels; impact and tensile strength data for use with resistance welded assemblies.

Extensive research has been and is being done not only by many organizations but also by manufacturing concerns with well-equipped laboratories.

One of the most important contributions of extensive research on power requirement and machine standardization has resulted in the growth of an increasingly favorable attitude on the part of the majority of power companies toward installation of resistance welding equipment. An official of a large Michigan power company recently remarked, "Tremendous improvements in design of resistance welding machines, together with excellent co-operation between manufacturers and power company officials have solved the power load problem and eliminated the difficulties of the past."

Resistance welding is now approximately 50 years old and may be said to have grown to its natural height, yet by no means has it reached maturity. Slow in growth and having had to overcome many handicaps, it is at last hitting its proper stride.

Today there are resistance welded structures, stress calculated, with a weld area equaling the physical characteristics of the parent metal; and the parent design. Equipment is purchased and production started under known laws of procedure, with calculations as precise as those covering production of the article by it replaced. Due to recent developments, the guesswork and rule-of-thumb determination of resistance welding applications now may be considered as a thing of the past.

MASS PRECISION AND AIRFOIL SECTIONS

Exactly different

Ever hear of a machine to make parts that are *exactly* different? That's actually what Nichols did for a group of aircraft designers . . . they needed accurate metal models of wings, 36 inches long and 6 inches wide, with an infinite variety of airfoil sections—and they needed them in a hurry for wind tunnel tests.

Nichols made such a machine to turn out *any* desired wing section accurately and quickly—so quickly in fact that the engineers, with this new tool, made nine years' progress in one!

This is an example of Nichols' understanding of precision production problems, of Nichols' unlimited source of engineering methods. In short, a sample of Nichols Mass-Precision. A booklet showing some of the products made for other concerns will be sent on your request.

W. H. NICHOLS & SONS, 48 WOERD AVENUE, WALTHAM 54, MASS.

"Accurate" *Nichols*

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PRECISION ENGINEERING AND MANUFACTURING FACILITIES FOR MASS PRODUCTION

150°
BELOW ZERO

In a KOLD-HOLD electrical refrigeration cabinet you can process metal parts and tools consistently at closely controlled temperatures as low as 150 deg. below zero—much lower than can be attained by the use of dry ice and the lowest temperature yet commercially available. This unit is especially designed for hardening steel tools, making expansion fits on close tolerance assemblies, for experimental work, and for product research.

These cabinets are built in two sizes, one having a work capacity of 5 cu. ft. and the other a capacity of 11 cu. ft.

Write for further specifications and quotation.

KOLD-HOLD MANUFACTURING COMPANY
444 NORTH GRAND AVE. • LANSING 4, MICH.

KOLD-HOLD

Corrosion Preventives

(*Continued from Page* 132)

of types used is necessarily limited.

For overseas shipment in conjunction with outer wrappings and long-time indoor storage, solvent-wax, solvent-resin, solvent-grease, solvent-asphalt, medium and soft grease and oil types are suitable. The selection can be governed by other factors than protection alone. For short-time indoor storage, the oil types are most suitable and are easily applied and removed. They can be expected to give good indoor protection if the conditions are not too severe. For temporary protection between operations of a few weeks' duration, the solvent-oil type fingerprint neutralizers are the most satisfactory.

The table presented on P. 132 sums up range of protection by various types of compounds.

To further help in the selection of a suitable type of rust preventive for either overseas or domestic use, the following six points should be considered in choosing a rust preventive:

(1) Protection requirements.

(2) Expected temperature range.

(3) Function other than protection (lubrication properties).

(4) Removability.

(5) Product to be protected. (Composition—surface—construction).

(6) Application method.

These factors, in order of importance, should govern the choice of a compound. They do not apply to long-term outdoor or shed storage. Obviously, there is only one requirement to be met in these cases, and that is protection.

The first two points are not always easily determined but, in the absence of definite information, the best possible preservative should be used.

The third requirement should be considered only when absolutely necessary and it is known that the anticorrosive protection of a lubricant-preservative will be sufficient. It is better practice to choose a compound for its protective ability only, and use the proper lubricant when the equipment is put into operation.

The fourth requirement is mainly important when equipment is known to be destined for use in the field where facilities are limited.

Consideration of the fifth point will be necessary mainly when parts are composed of rubber, leather, plastics, etc. in combination with metals. The preventive selected must be of a nature not harmful to the other materials assembled with the metal parts.

Method of application is the least important requirement and should be considered only when all the others have been met.

Additional Protection: All previous efforts in processing and preserving metal parts or assemblies would be wasted if they were not properly pack-

ANOTHER FIRST IN ENGINE DEVELOPMENT

THE COOPER-BESSEMER SUPERCHARGED GAS ENGINE

COMPLETE, unqualified success in supercharging an engine operating on gaseous fuel is announced by Cooper-Bessemer.

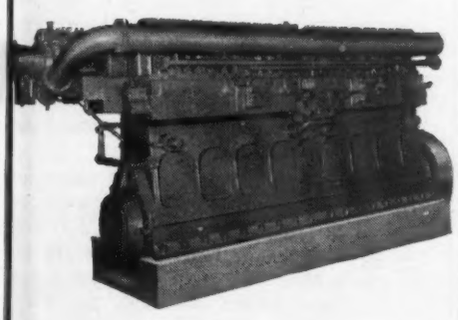
This provides:

An increase in horsepower of 40 to 50 percent, with no appreciable increase in engine weight or space.

Supercharging is made possible and practical by a simple, *patented* means of timing the admission of gas, which permits complete scavenging, under pressure, without fuel loss.

The advantages of this revolutionary development are not limited to future installations. All Cooper-Bessemer supercharged diesels now in service can be converted readily to gas fuel operation, or to operation on any combination of gas and oil fuel.

The nearest Cooper-Bessemer office will gladly furnish any additional information you might require on the profitable application of this development to your present or future needs.



THE COOPER-BESSEMER CORPORATION
Mount Vernon, Ohio Grove City, Pa.

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New York, Washington, Houston, Dallas, Tulsa, Shreveport, Los Angeles, St. Louis, Seattle, New Orleans

BUILDERS OF FINE ENGINES FOR 112 YEARS

Metal will not Rust if it's IRCO-IZED

THE IRCO-IZING PROCESS IS A CHEMICAL DIP TREATMENT FOR IRON, STEEL, ZINC & CADMIUM PROVIDING A RUST INHIBITING BASE FOR PAINT OR . . . A FINAL FINISH

• THE IRCO-IZING PROCESS MEETS ALL GOVERNMENT SPECIFICATIONS CALLING FOR PHOSPHATE COATINGS

The competitive nature of consumer goods, compels us to give the public the finest and most serviceable finish. Naturally it is essential to protect the finish of your production against early breakdown and corrosion.

To best accomplish this, the foundation must be properly treated to prevent the finish from deterioration due to rust and corrosion.

The IRCO-IZING PROCESS will not only prevent and inhibit rust, but will form a more perfect bond for the finish.

The buying public today is more conscious of deterioration due to rust and corrosion, principally because they have been forced to keep their cars, appliances and machinery, et cetera far longer than heretofore, and therefore understand today the importance of rustproofing. You can give them this assurance by use of the IRCO-IZING PROCESS.

The IRCO-IZING PROCESS is serving our forces on every battle front, under unbelievable climatic conditions and abuse. G.I. Joe knows the importance of this improved rustproof finish and will demand the same serviceability for his car, wire screens, washing machine, refrigerator and thousands of other products he uses when he comes home.

REMEMBER—G.I. Joe today is tomorrow's consumer.

Our Engineering Department will be happy to co-operate with all manufacturers who wish to improve their present methods, and will help you adapt the IRCO-IZING PROCESS to your needs.

WRITE US FOR FURTHER INFORMATION AND LITERATURE.

INTERNATIONAL RUSTPROOF CORP.

12507-15 PLOVER AVENUE CLEVELAND, OHIO

aged for overseas use. The importance of wrapping has been so greatly stressed during the war production era that industry now realizes that proper packaging also will be essential in peacetime.

Briefly, there are three major methods of packaging prescribed by the armed forces:

Method I covers unsealed wrapping in grease-proof, noncorrosive material, either wrapper, package or carton.

Method I-A covers sealed wrapping in waterproof packaging material and provides the longest waterproof protection to parts which have been properly cleaned and preserved.

Method II covers sealed wrapping using a dehydrating agent within the package to absorb moisture from the included air or from any leakage of air that may occur. By this method, the final package is moisture-vapor proof as well as liquid-water proof.

One of the principal reasons for careful packaging is to insure protection of the rust preventive film which has been carefully applied over metal parts.

In time of war no effort is too great to see that metals reach their destinations fit for immediate use. And in time of peace we shall learn from the experiences of war that conservation and economy will go hand in hand with proper protection against that common enemy, rust.

Machining Die Castings Covered by New Book

"Practice in Machining Zinc Alloy Die Castings," a textbook of 68 pages, 6 x 9 inches in size, has just been published by The New Jersey Zinc Co., 160 Front street, New York 7.

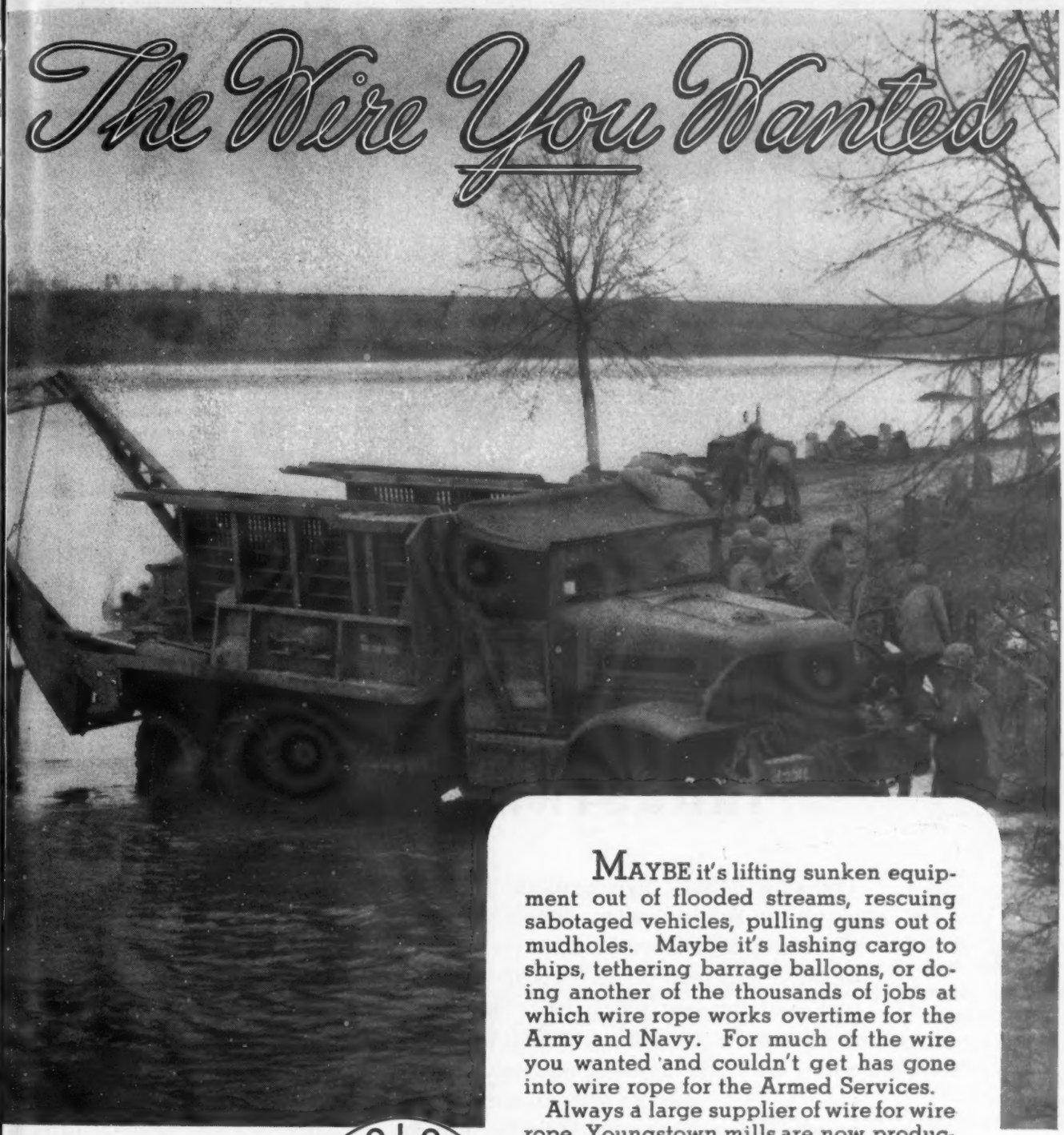
In the foreword it is pointed out that, while one of the principal advantages of zinc alloy die castings is that they do not require expensive cutting or grinding operations to prepare them for use, certain light machining operations may be required to remove flash, to true critical surfaces, to finish plain or threaded holes, etc.

This book, with the help of 57 line cuts and action photographs of tools and machining setups, goes into great detail as to how these machining operations —minor though they are—can be performed most effectively and economically. Twenty-seven operations and considerations are dealt with, making this book a real encyclopedia of machine shop practice for producers and users of die castings.

Incidentally, a number of cases are covered wherein the finished part undoubtedly could be attained by casting alone. However, the complexity of the dies and the slowing down of production would more than outweigh the slight cost of efficient supplementary machining.

Copies of this book are available from The New Jersey Zinc Co. to those who properly identify themselves through formal requests on the letterheads of their companies.

The Wire You Wanted



An American Truck lifts an assault boat off a submerged bridge over the Moselle River. Note the reel of wire rope on the front. Official U. S Signal Corps Photo.

MAYBE it's lifting sunken equipment out of flooded streams, rescuing sabotaged vehicles, pulling guns out of mudholes. Maybe it's lashing cargo to ships, tethering barrage balloons, or doing another of the thousands of jobs at which wire rope works overtime for the Army and Navy. For much of the wire you wanted and couldn't get has gone into wire rope for the Armed Services.

Always a large supplier of wire for wire rope, Youngstown mills are now producing at maximum capacity to help meet America's needs for this extremely vital war material--at the same time maintaining those exacting standards of quality that have given Youngstown Yolectro high carbon rope wire its enviable reputation for excellence.

Whether it is wire for today's needs or post-war, we want to talk to you. Our modern plant equipment, our experienced personnel, our knowledge and ability are at your service, to meet your most rigid requirements - now and in the future.

YOLOY TRADE MARK YOUNGSTOWN STEEL

YOUNGSTOWN

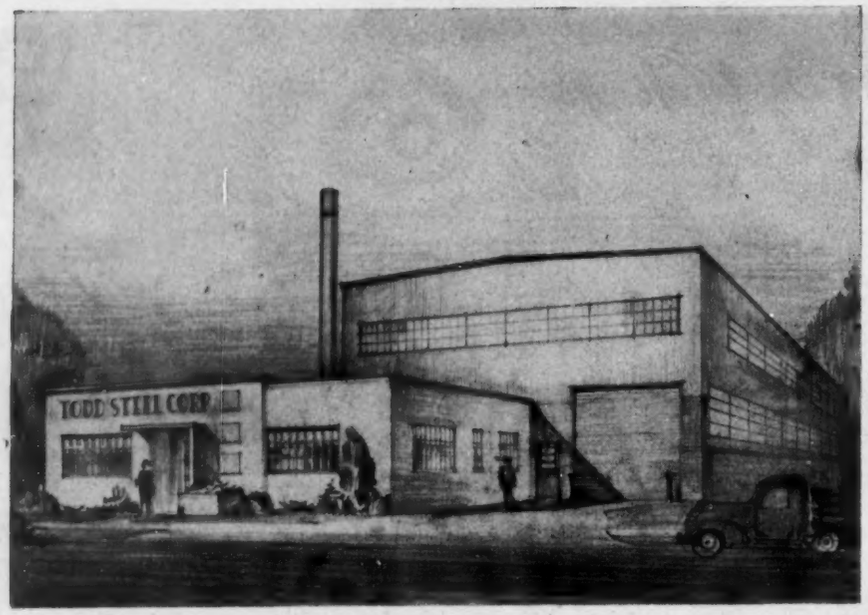
THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN, OHIO

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Wire - Nails - Tie Plates and Spikes - Pipe and Tubular Products - Conduit - Sheets and Plates - Coke Tin Plate - Electrolytic Tin Plate - Bars - Rods



TODD OFFERS . . . . .

STEEL SERVICE

TO THE MANUFACTURING INDUSTRY

The same TODD Service which has been recognized as outstanding, during this war-time emergency is now available in even greater capacity than ever before. TODD has just completed this new warehouse to assist you in solving the problems of STEEL SUPPLY arising from continued war needs plus reconversion. This warehouse has a capacity second to none in the country and is equipped to do square or circle shearing from sheets ¼" or lighter. The name TODD is symbolic of Service.

May we serve you?

TODD STEEL CORP.

170 MIDLAND AVENUE

DETROIT MICHIGAN

Annealing and Hardening

(*Continued from Page* 136)

ball bearing spindles, by rolling contac of spindle rims with spring-loaded fric tion sections, positioned end-to-end, alon the heater tunnel length. Each of th tables rotates 6 times while passin through the heating zone, and 15 time during its entire travel down the tunne length. About 1800 shell cases ar handled per hour. Cases are 37 and 4 mm steel.

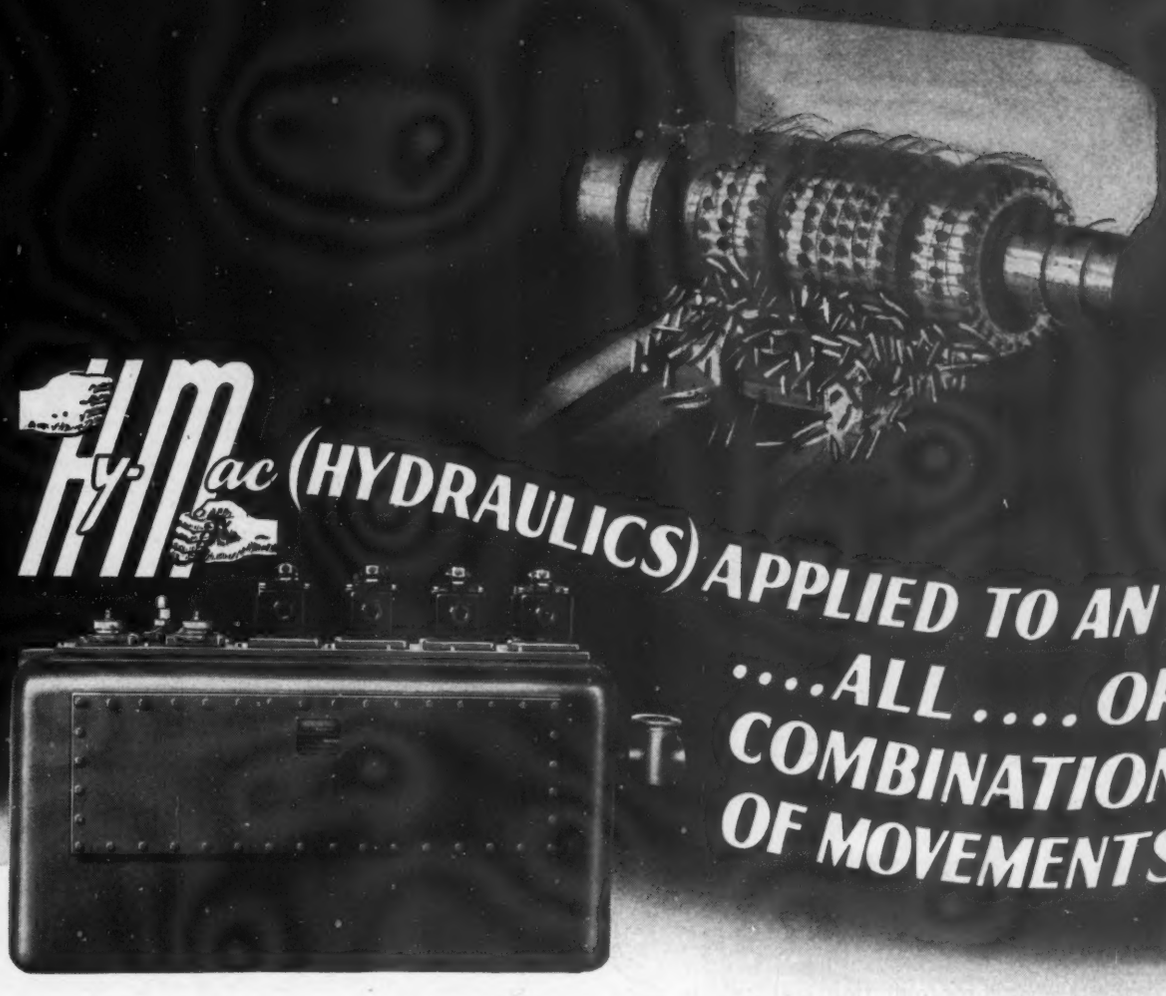
Another machine adapted for thi operation is fitted with fingers, whic roll or rotate the cartridge cases pas the open flame burners, and on into a insulated cooling chamber.[3] A variabl speed drive is provided for the wor carrier.

One company[4] makes two types o gas-fired annealing machines. On handles shell cases up to 20 mm, whil the other handles larger sizes. Gas burne equipment is fitted with a height adjust ment, in order to handle cartridge case of different sizes on the same machine For larger case sizes, a conveyor chai mounts rotating work-spindles for turnin the pieces as they are carried throug the flame.

Spot or localized annealing also is don by means of an oxyacetylene torch flame In the hands of an expert, fair result sometimes may be obtained by thi method, particularly on carburized stee parts. In some cases, however, piece have been cracked by this method. O after a given spot has been annealed wit a torch flame, it may be just as hard o even harder than when started. Th reason for this is that too much heat i applied, raising the temperature abov the critical range. Then, when the flam is removed, the surrounding cold meta drains the heat away so quickly tha almost the effect of a quench is obtained again hardening the heated spot.

It is extremely difficult to know whe a spot has been brought to the correc temperature for providing proper anneal ing, and just as difficult to remove th heat slowly from that point so that prope annealing will be obtained. Possibl (there has been no opportunity to ex plore the full possibilities of this sug gestion) if a short length of tubing wer set on end over the spot to be heated a layer of sand placed therein, the flam played on tubing and sand until the tub was brought to a white heat, and th surrounding area lightly touched by th torch flame afterward for a brief perio of time, it would be possible to obtai better results. It would seem that given size of tubing so used, with given depth of sand, would yield definite determinable results, capable of bein repeated.

Electric Heating Applications: Electri power is being used in a number o ways on localized annealing jobs. Som electric etching tools are equipped wit carbon electrodes for special and eme gency localized annealing operations. A least one such tool, primarily built fo marking of all types from the lightest



Hy-Mac (HYDRAULICS) APPLIED TO ANY ....ALL.... OR COMBINATION OF MOVEMENTS

12777 (above)—Special power unit for controlling and actuating a special contour type milling machine with multiple slides. This design permits the assembly of the completed unit on the base of the machine and provides easy accessibility for adjustment and maintenance. The control is electric through push-button and limit switches, reducing the piping to a minimum, the only pipes being used, other than those incorporated in the unit itself, are those connecting the unit to the actuating cylinders.

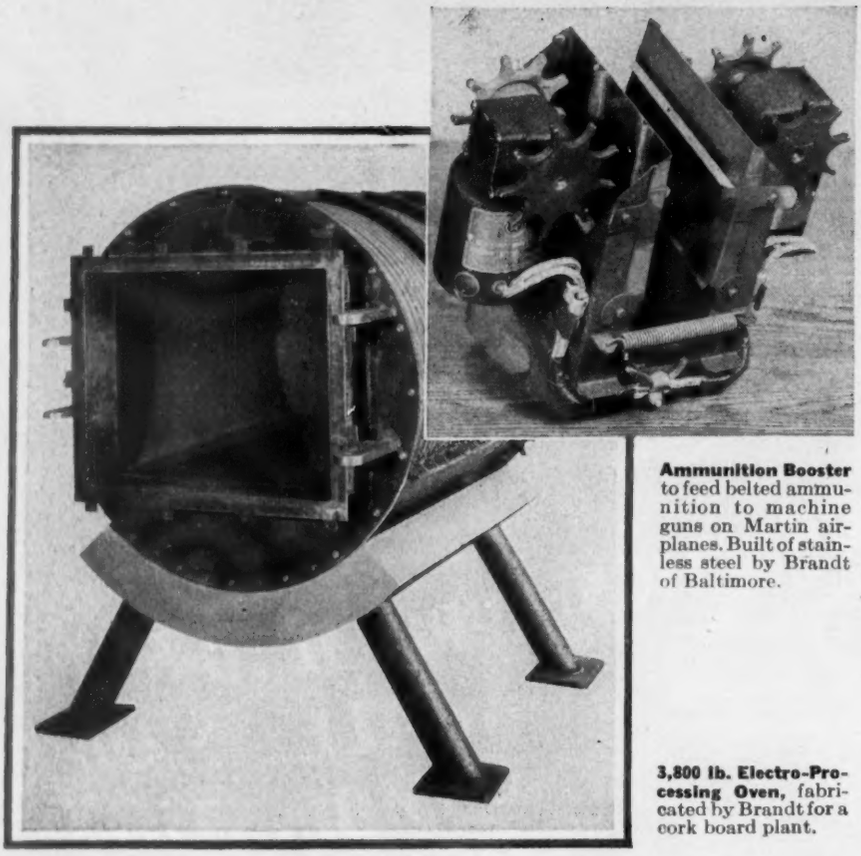
"Hy-Mac" Hydraulic Power Units can be applied to milling, drilling, grinding, boring, piercing, riveting, broaching, pressing . . . just determine the functions of the machines that are to be hydraulically operated—and our engineers will recommend a Power Unit and a layout of circuits to best do the job . . . For feed and traverse of multiple or single tools . . . for indexing and locating . . . for clamping, etc. . . . any . . . all . . . or combination of movements can be adapted to "Hy-Mac" HYDRAULICS . . . Designers or builders of machines can accommodate their specific design, either partially or completely to "HY-MAC" HYDRAULICS . . . and our modern plant, together with a comprehensive engineering department is completely competent to handle all of the technical planning, designing, and detailing in connection with building of hydraulic and specific-purpose machinery . . . Our engineers will make recommendation and preliminary proposal without obligation.

HYDRAULIC MACHINERY INC.

12825 FORD ROAD DEARBORN, MICHIGAN

HYDRAULIC MACHINERY - WESTERN DIVISION • 1105 N. Pacific Ave., Glendale 2, California

HYDRAULIC MACHINERY



Ammunition Booster to feed belted ammunition to machine guns on Martin airplanes. Built of stainless steel by Brandt of Baltimore.

3,800 lb. Electro-Processing Oven, fabricated by Brandt for a cork board plant.

These Fabrication Facilities May Fit Your Postwar Plans

If your postwar production will include some fabrication to be done by a reliable, experienced, metal-working organization . . . Brandt of Baltimore can fill a definite need for you.

For over 50 years Brandt has fabricated metal for scores of industrial uses. Present products range from small, formed units of a few ounces to huge fabricated assemblies weighing 30 tons. The Brandt 8½ acre plant has complete, modern equipment for shearing, rolling, forming, welding. Machine capacities range from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. All metals, ferrous, non-ferrous and alloy, can be completely fabricated to your specifications.

And if you've hit a snag on your postwar product, our designers and engineers will welcome the opportunity to assist in planning the details and specifications. Naturally, all plans will be held in strict confidence. So if there are fabrication or design problems in your postwar plans, we invite you to discuss them with—

BRANDT of Baltimore

Charles T. Brandt, Inc., 1702 Ridgely Street
Baltimore 30, Maryland

BRANDT of Baltimore • Craftsmen in Metal Since 1890

the deepest and heaviest on the production line has been considerably used for spot and localized annealing.[5]

Fig. 1 shows a modern electric etching tool used for localized annealing on a drill gage. A carbon electrode is installed in the etcher in place of the usual marking point, and heat is applied around a drill gaging slot to be reduced in size. Metal is brought to a cherry red color, and the section marked "A" is tapped with a hammer to close up the slot. Adjoining gage slots are unchanged, so it is necessary only to mill out the slot. This operation proved so simple that a woman is employed for the operation. The same etching tool later was developed into a 24-stage electrical marker, and now is used on many localized annealing jobs about the plant.

Resistance welding machines can be used to advantage for localized annealing in jig, fixture and die work. Welders are being used in some aircraft factories for localized heating and annealing. It usually is necessary to change the timing setup.

Electric heaters have been specifically developed to produce spot or end heats on a wide variety of parts[6]. In some cases, parts to be upset are handled on electrical localized heating machines of this type, as well as for localized hardening and annealing. The heating cycle is directly controlled by photo electric tube. Work is inserted between tips of electrodes shaped to the work. The instant electrodes are closed the work begins to heat. When it reaches the temperature for which the control tube is set, the jaws open and the heated piece drops out. In highly accurate localized annealing processes a soaking or leveling-off heat can be provided, controlled by an electric time clock. This arrangement permits a lower voltage to serve for any predetermined length of time, after the electric eye has stopped regular heating. Such heating units may be used in various sizes for practically any voltage or frequency.

High-Frequency Induction Heating: Considerable attention has been given to the development of localized annealing equipment by manufacturers of high-frequency apparatus. It is possible to apply heat by this method with close control over localization.

In one instance, relatively thin shells are subjected to induction heat at annealing temperatures around the inside of the nose, without allowing this heat to penetrate the metal and change its physical characteristics. This particular operation was developed because certain 75 mm shells were being modified for a different nose fitting, and the modification called for tapping and chasing threads. Trouble developed when the taps and chasers used were found to have a very short life.

The reason for rapid failure of the taps was soon discovered. On a previous shot-blasting operation, hardened shot had been used which occasionally lodged in the threading. The purpose of the localized annealing operation, therefore, was only to anneal such of these shot

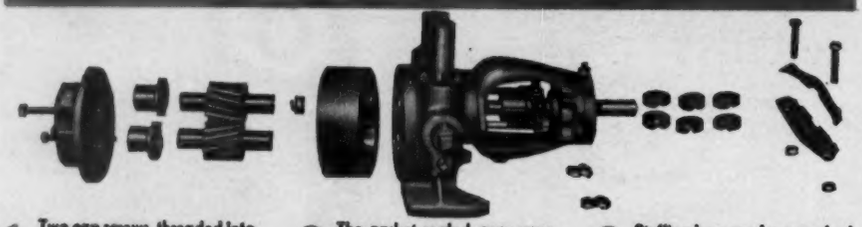
No one at this moment can profess full acquaintance with all the uses of powdered metals. Production is being diversified too rapidly and knowledge of what can be done is being extended too fast, in too many directions, for that. But manufacturers who wish to inform themselves of such developments will find it of interest that the Molybdenum Corporation, being a supplier of high-purity metal powders and alloy powders of exactly specified content, is also a source of advice on many of the new possibilities in this field. Powders of molybdenum, tungsten, and boron, in different particle sizes and different degrees of purity, are made and recommended for different requirements. A descriptive catalog of M.C.A. products is issued and correspondence is invited.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz.; Urad, Colo.

MOLYBDENUM **CORPORATION OF AMERICA**
GRANT BUILDING **PITTSBURGH, PA.**

MCA

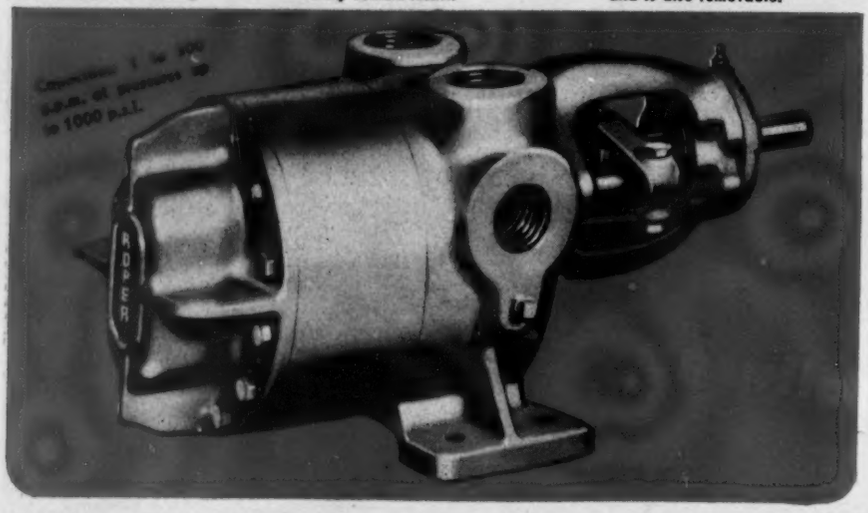
HOW ROPER PUMPS CAN BE SERVICED WITHOUT DISTURBING PIPE CONNECTIONS OR MOUNTING



1 Two cap screws, threaded into jack screw holes, pull face plate. Front flanged bearings and gears slip out easily. Flexible slider coupling is removed thru hole in opposite bearing.

2 The gasket-sealed gear case separates from back plate. Back flanged bearings are easy to get out. The back plate, pipe connections, mounting, and power unit, remain intact.

3 Stuffing box can be repacked quickly with split-ring packing by removing 2-piece cap. Split-gland slides forward on shaft to allow clearance, serves as tamp, and is also removable.



ROPER DESIGN CUTS DOWN-TIME

As illustrated above, Roper pumps are designed for easy accessibility to working parts. It's *not* necessary to disturb piping, power unit, or pump mounting to inspect or replace gears, case, bearings or packing.

When an old unit requires attention, or a destructive foreign element causes trouble, easy accessibility to internal parts cuts down-time . . . helps speed up the service job. And to help avoid costly delays in making repairs, interchangeable replacement parts and packings are available and can be supplied on short notice.

In addition, service and engineering offices are located in principal cities to help you with pumping problems. Investigate the Roper line and facilities today. *Write for full facts.*

GEO. D. ROPER CORP., ROCKFORD, ILLINOIS

OTHER IMPORTANT ROPER FEATURES

- EFFICIENT OPERATION IN EITHER DIRECTION.
- AXIAL HYDRAULIC BALANCE.
- FLOATING EQUAL SIZE EXTERNAL GEARS.
- OVERSIZE BEARINGS. GEARS SUPPORTED AT BOTH ENDS.
- CONTINUOUS BEARING LUBRICATION FROM PRESSURE TO SUCTION SIDE.
- PACKED BOX OR MECHANICAL SEAL UNITS TO SUIT REQUIREMENTS.
- FREE ENGINEERING ASSISTANCE, OFFICES IN PRINCIPAL CITIES.
- 68 YEARS OF EXPERIENCE

Write for Catalog 6-48

Get full story on Roper time-tested principle and free engineering service. Catalog contains address of Roper pump engineers and service offices in principal cities. Also ask for booklet "How To Solve Pumping Problems."

PUMPS ESPECIALLY ENGINEERED TO FIT YOUR REQUIREMENTS

ROPER *Rotary Pumps*

BUILDERS OF PUMPS FOR MANUFACTURING, MARINE, PETROLEUM, AND PROCESS INDUSTRIES

as had become thus lodged. A high-frequency heating device was provided, with coils especially designed to fit into the shell noses. Energy is supplied by an induction generator, and heating is applied instantaneously by means of push-button control. Temperature is controlled exactly within the threaded area, and no annealing occurs beyond the points desired.

References

[1] Michigan Chrome & Chemical Co., Detroit
[2] Selas Co., Philadelphia
[3] American Gas Furnace Co., Elizabeth, N. J.
[4] Morrison Engineering Corp., Cleveland
[5] Luma Electric Equipment Co., Toledo, O.
[6] American Car & Foundry Co., New York

Training Program Considers Carbide Tools

A training program with films, charts, and instruction leaflets, designed to enable shell manufacturers to obtain better overall performance and increased service life from carbide tools, has been developed by Carboloy Co. Inc., Detroit. Program is intended to assist in keeping consumption of critical carbide shell machining tools at levels corresponding to available output rate for such tools by the carbon industry when the scores of new shell plants are in full production.

Complete course is designed to serve two purposes. In new shell plants it will provide basic training in use of carbide tools in general and will give specific instructions in use of carbide tools for shell machining operations. In shell plants where carbide tools have been in use for some time, course will serve as a refresher and will furnish new information on improved practices in machining. Course will be distributed through company district offices, and field engineers and district managers will help plants put it into operation.

Steel V-Belts Used in Motorcycle Transmissions

Steel cable V-belts for power transmission, where stranded steel replaces conventional cords or fabric in belts' carcasses, have aided development of a low-weight, low-cost motorcycle. Goodyear Tire & Rubber Co.'s Mechanical Goods Division, Akron, O., is providing belts used in these motorcycles for the armed forces.

Use of V-belts permits a simple type of clutch in motorcycles as well as a variable transmission, eliminating sprockets and gears. Each light motorcycle requires two V-belts, one linking the single-cylinder engine to the clutch wheel and the other linking the clutch wheel to the rear or drive wheel. Clutch operates by tightening or slackening pressure of drive belt. Drive belt also is said to absorb power impulses and dampen vibrations, permitting lighter motor and chassis members and use of electric welding almost entirely in chassis.

PAYROLL SAVINGS PLAN

NOW'S THE TIME FOR

Your BIG "MOP-UP"!

RE-SOLICITATION is the keynote for a victorious "mop up" in the Mighty 7th War Loan. Bond rallies plus continuous competition between departments help to keep Bond subscriptions on a quota-topping climb. Strategic poster displays . . . showings of "Mr. & Mrs. America," the Treasury film . . . distribution of the War Finance Booklet, "How To Get There," and the handy Bond-holding envelopes play an important part. But, above all else, arrange to have every employee asked *once more*—and personally urged *once more*—to meet his personal quota in the Mighty 7th!

The Payroll Savings Plan is the mainstay of every War Loan—meeting your plant quota is vital to the success of the 7th! Remember we have to make two drives in 1945 do the work of three last year. Put on an intensive "mop up" final to help mop up the Japs, cut the tentacles of inflation—and lay the foundation of security.

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

PAGE *for* WIRE

...AND THE RIGHT ANSWERS TO WIRE QUESTIONS

● If the question has to do with wire or the use of wire in production, **PAGE** can serve you. Wire and its application have always been the business of **PAGE**.

WHAT SIZE WIRE?

What size will do the job best and most economically? **PAGE** can give you the answer—and supply the wire.

WHAT SHAPE SECTION?

PAGE makes wire in many standard shapes. If you need a special shape, **PAGE** can make it for you—in end-section areas to .250″ square—widths to ⅜″. You draw the shape—**PAGE** can draw the wire.

WHAT ANALYSIS METAL?

PAGE is regularly drawing wire of high and low carbon steel, Armco ingot iron, stainless steel, special alloys. Heat-treating and finishes to required specifications.

WHICH WELDING ELECTRODE?

PAGE offers a wide range of welding electrodes and gas welding rods, including **PAGE**-*Allegheny* stainless steel.

When you have a question involving the use of wire, it will pay you to

. . . get in touch with Page!

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

ACCO TRADE MARK

Conveyor Oven

(*Continued from Page* 144)

4. Preheating.
5. Finish baking.
6. Cooling.
7. Unloading.
8. Truck return.

Oven Construction: The installation is basically one oven shell approximately 75 ft in length. The work clearance is 88.6 in. wide by 8 ft 9 in. high throughout the system. The oven shell is constructed of 4-in. by 20-gage and 18 gage glasswool insulated oven panels. The floor area is further insulated with 8-in. by 16-gage similar panels. The ends of the oven are sealed with horizontal motorized doors. The sealing between all the zones within the oven shell is done with slat type vertical motorized roll curtain doors constructed of 16-gage steel slat. These doors are not insulated.

Supply ductwork for air handling is mounted on either side at the floor level, to direct the air most efficiently over the work. Recirculation and exhaust ducts are mounted either on the underside of the ceiling or on the side walls close to the ceiling.

Heating System: Because of the heavy hourly loads to be run and the exceptionally large volume of air to be circulated for temperature evenness in the oven, a 2,000,000 Btu indirect fired heating system is provided. On a 70° F operational basis, a total of approximately 17,000 cfm are circulated, the greater part of which goes through the air heaters to the ovens and from the ovens to the air heaters. The air heaters are mounted in tandem for battery operation, and provisions are made to run only one of the two units in case of insufficient production.

On the air-handling side of the heating system, air is supplied under pressure by a recirculating fan, the suction side of which is connected to the oven system. Not all of the air is circulated through the air heater, but a portion of the air is bypassed to reduce static pressure build-up through the tube stocks.

The heaters are fired with two atomizing-type proportioning fuel oil burners arranged for commercial grades of fuel oil. The burners operate on 18-pound oil pressure and 20-ounce combustion air pressure supplied by a turbo blower.

At the outlet of the combustion gas of the air heater, a high temperature exhaust fan is used to assure positive combustion gas circulation through the interchanger. The pressure side of this waste gas fan is connected to an exhaust stack. At the outlet of the hot gas fan is a pressure duct connected back to the combustion zone. Thus through the use of adjustable volume dampers a maximum quantity of the waste combustion gases are recuperated and their incipient heat is used to effect further operating economies. By the recuperation of these combustion gases an estimated 10 per

Equipped to Serve the 76% with ACME ALUMINUM CASTINGS!

76% of the plants answering a recent materials survey said they use aluminum in some form in their normal products—and a large percentage of them indicated they expect to increase their use of this light weight, corrosion resistant metal.

Since Acme was founded over a quarter of a century ago, it has steadily expanded its service to meet the advancing needs of the metal-working industry.

Today Acme facilities for the production of aluminum castings by the *permanent mold process* represent the very latest developments in technique and equipment. Acme assumes the responsibility for all steps in production. Acme makes the pattern; Acme makes the mold; Acme pours the metal. You can rely upon Acme Permanent Mold Castings for accuracy, for uniformity, for outstanding quality.

The advantages offered by Acme Permanent Mold Aluminum Castings may help you to lower costs; to improve production. Our engineers will be glad to submit recommendations.

GET THE COMPLETE ACME STORY — Send for 44-page, fully illustrated book, showing how Acme is organized and equipped to supply your castings needs and to render complete service to the metal-working industry.

ACME *Aluminum Alloys, Inc.*

Formerly Acme Pattern & Tool Co., Inc.

DAYTON 3, OHIO

PATTERNS • TOOLS • ALUMINUM CASTINGS • ENGINEERING

"CLEANLINED"

by Baker...

MODEL 26-HO

Hydraulic feed single or multiple spindle drilling machine furnished as single spindle with capacity 3" diameter drill in solid SAE 1035 steel. Also adapted to use of fixed center multiple heads built to suit customer's requirements.

This type of machine of various sizes has been built to further the war effort. These machines are adaptable to post war use and can be retooled with new multiple heads and fixtures to prospective customer's advantage. We will cooperate in the retooling of war built Baker machines and will gladly furnish information pertaining to the machines when serial number is given direct to our factory office or to our exclusive representatives.

Barber, F. F. Machy. Co., Toronto, Ont.; Walkerville, Ont.; Montreal, Quebec
Buckner-Weatherby Co., Inc., Seattle, Wash.
Chandler Machy. Co., Atlanta, Ga.
Dohan, Mr. Joseph F., New Orleans, La.
Machinery Sales Co., Los Angeles, San Francisco, Calif.
Marshall & Huschart Machy. Co., Chicago, Ill.
McVoy-Hausman Co., Birmingham, Ala.
Motch & Merryweather Machy. Co., Cleveland, Ohio; Cincinnati, Ohio; Detroit, Mich.; Pittsburgh, Pa.
J F. Owens Machy. Co., Syracuse, N. Y.
Penny, Mr. Sam H., Houston, Texas
Stedfast & Roulston, Inc., Boston, Mass.
Stephens, Rober R. Machy. Co., St. Louis, Missouri
Swind Machinery Co., Philadelphia, Pa.
Vandyck Churchill Co., New York, N. Y.
George Keller Machy. Co., Buffalo, N. Y.
Perry Machy. Co., Dallas, Texas

BAKER BROTHERS
Incorporated
TOLEDO, OHIO, U. S. A.

cent reduction of fuel cost has been effected.

All of the heating equipment is mounted at the side of the oven as shown in Fig. 2.

Control Equipment: It was necessary to control the temperatures of the system very closely, so that whites and pastel shades could be easily matched. This is accomplished by the use of a mercury-actuated remote bulb recorder controller, the bulb of which is mounted in the baking zone of the oven proper. Another similar indicating controller bulb is mounted in the heated air supply duct at a point where the duct goes into the oven. In addition, nonindicating temperature controllers are mounted in the individual outlets of each air heater. Series parallel wiring connects these controllers to a heavy duty motor that varies both the fuel oil and combustion air input to the actual heat requirements at any one of four points in the system.

Safety control equipment including photoelectric flame relays guards the complete system against fuel, combustion air, current, pilot or motor failure.

Under or over voltage fluctuating conditions are taken care of by under and over voltage relay equipment. Air switches interlock all fans with the conveyor operation.

Conveyor: The conveyor is used to propel the loaded work trucks through the entire system. This conveyor is a 4-in. pitch drag chain type with retractable type pusher dogs on 5-ft centers. Alternate 2-ft retractable return dogs are provided to prevent the trucks rolling forward. The chain rides in heavy structural channel tracks equipped with heavy rolled-plate wearing dogs. The head-shaft to tail-shaft centerline is approximately 120 ft, indicating the overall length of the system. The main conveyor drive consists of a variable speed motorized reducer equipped with disk brake and torque-limiting device. The brake is used to prevent conveyor coast and the torque-limiting mercury clutch limits horsepower and prevents jamming of the conveyor in case of accidents.

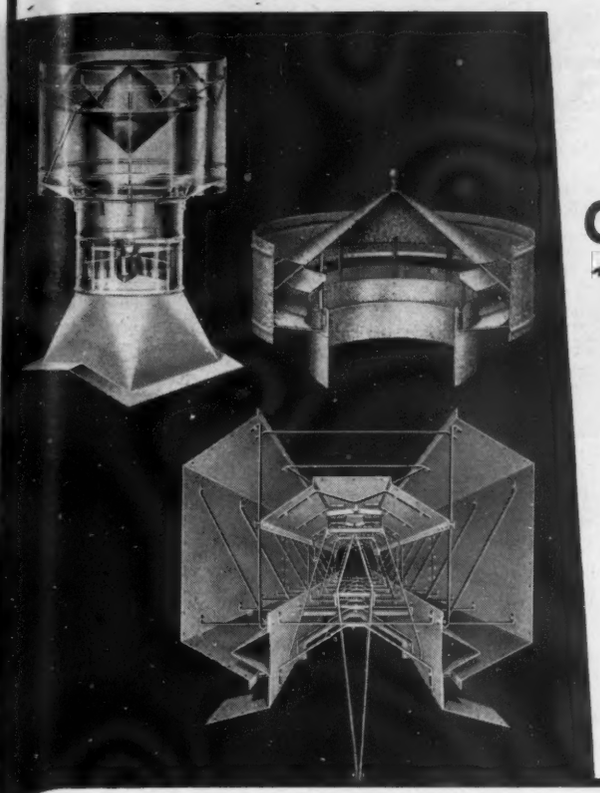
Conveyor control consists of the necessary timing drive to start and stop the system and the necessary limit switches and control actuators to perform the following synchronized circle.

1. Conveyor at rest.
2. Timer times out.
3. All doors open.
4. Conveyor advances one station.
5. Doors close.
6. Conveyor rests.

The complete control cabinet to accomplish this function is shown on the main control panel at the front of the air heater.

Capacity: The capacity of the system is 12,000 lb of steel components per hour. Each truck weighs approximately 300 lb.

Conveyor timer setting can be adjusted between 12 and 24 impulses per hour, giving an overall baking time of from 45 to 90 min at temperatures

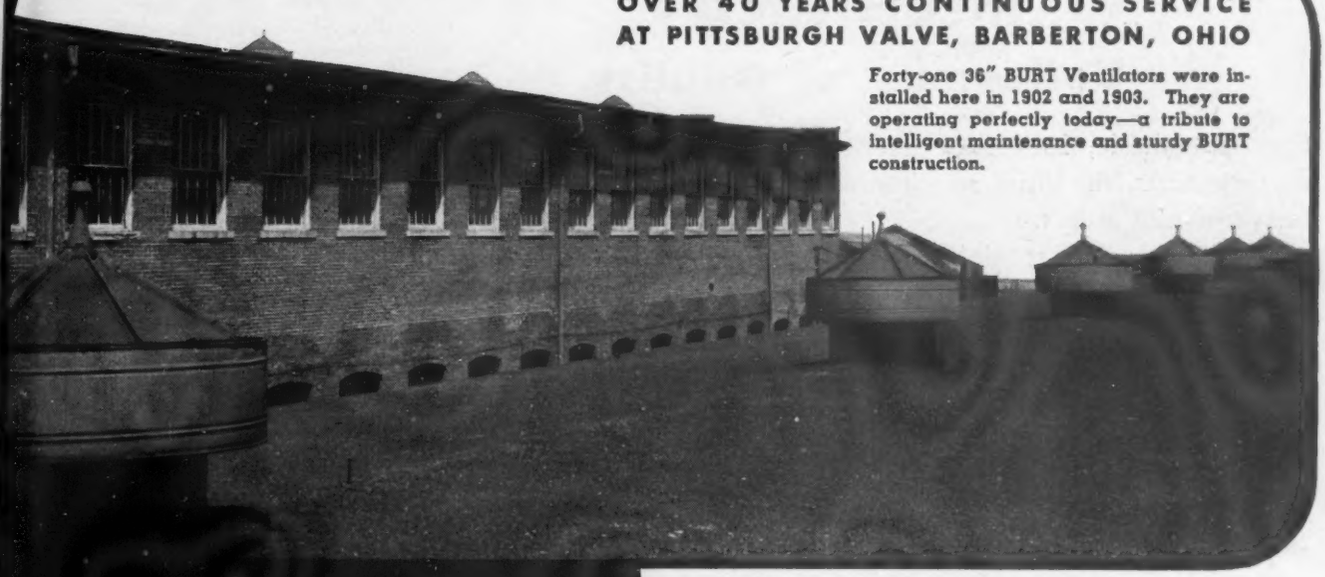


BURT IS THE COMPLETE VENTILATOR LINE

The complete BURT line of gravity, fan, revolving head and continuous ridge ventilators includes a type and size to put air to work most efficiently and economically for your specialized needs. Standard types are usually available from stock. Special units can be designed and manufactured quickly if required.

BURT'S engineering skill and know-how of more than half a century in designing and building ventilators is available to you without cost—anytime. Your inquiry will receive prompt and qualified attention.

OVER 40 YEARS CONTINUOUS SERVICE AT PITTSBURGH VALVE, BARBERTON, OHIO



Forty-one 36" BURT Ventilators were installed here in 1902 and 1903. They are operating perfectly today—a tribute to intelligent maintenance and sturdy BURT construction.

OTHER BURT PRODUCTS

BURT OIL FILTERS repay their cost quickly by cutting lubricating expense and saving machinery. Made in all sizes from 5 gallons per day upward. For use with and without oiling systems. Used in industry for over 50 years—more than 300,000 in service.

BURT EXHAUST HEADS increase boiler economy, reduce noise and save roofs. Sizes from 1 inch to 20 inches in stock. Available in two types.

THE BURT MFG. CO.
ROOF VENTILATORS • OIL FILTERS
EXHAUST HEADS
402 So. High St., Akron 11, Ohio

SEND FOR CATALOGS
•
Burt Engineers are glad to help on plans

Another Reason For

MICHIANA

Uniformity of Quality

For dependable, long-heat-hour performance that cuts production costs, the chief requirement is uniform quality of the heat-resistant alloys.

MICHIANA has specialized in the consistently accurate production of alloy castings for over a quarter century. During this time a vast number of different alloys with varying chemical compositions and physical properties have been produced. Each of these alloys resulted from long study, experimentation and thorough testing by specialized alloy foundrymen. The unqualified success of these castings under stress of practical application speaks a tribute to MICHIANA'S rigid consideration of every requirement from receipt of specifications to finished casting.

Regardless of whether your proposed casting has been pronounced impractical or impossible—whether your product demands conventional or untried applications of Heat-Resistant, Corrosion-Resistant or special Alloy Castings, let MICHIANA apply *Skill Through Research* to your specific Alloy Casting problem.

Data on leading alloys of a wide range of usage are discussed in Booklet 110. Write for a copy today.

MICHIANA PRODUCTS CORPORATION
Michigan City, Indiana

MICHIANA
Heat-Resistant and
Corrosion-Resistant
ALLOY CASTINGS

ranging between 175° F and 450° F.

This type of equipment exemplifies the trend in modern industry toward efficient combination of semi-automatic handling equipment operating in connection with high-speed convection-heated ovens. War demands have accelerated the manufacture and adoption by industry of such equipment, but the true value of it will become more apparent in peacetime, when a competitive market will make operating economies imperative.

Standards Book Contains All ASTM Specifications

The new 1944 Book of American Society for Testing Materials Standards, issued in three parts, contains in their latest approved form all of the Society's specifications and tests for materials. An important book in connection with production, purchase, and use of materials, it has 1235 specifications and standard methods covering more than 6000 pages. It is issued in the following three parts:

Part I. Metals: Ferrous and nonferrous metals (all A and B and some E serial designations) except methods of chemical analysis. General testing methods (E serial designations).

Part II. Nonmetallic Materials—Constructional. Cementitious materials, concrete and aggregates, masonry building units, ceramics, pipe and tile, thermal insulating materials (all C serial designations). Wood and wood preservatives, paints, varnishes and lacquers, road materials, waterproofing and roofing materials, soils (certain D serial designations). General testing methods, thermometers (E serial designations).

Part III. Nonmetallic Materials—General: Fuels, petroleum products, electrical insulating materials, rubber, textiles, soaps and detergents, paper, plastics, water (remainder of D serial designations). General testing methods, thermometers (E serial designations).

It also includes emergency standards and emergency alternate provisions which have been widely used to expedite production and procurement of important materials.

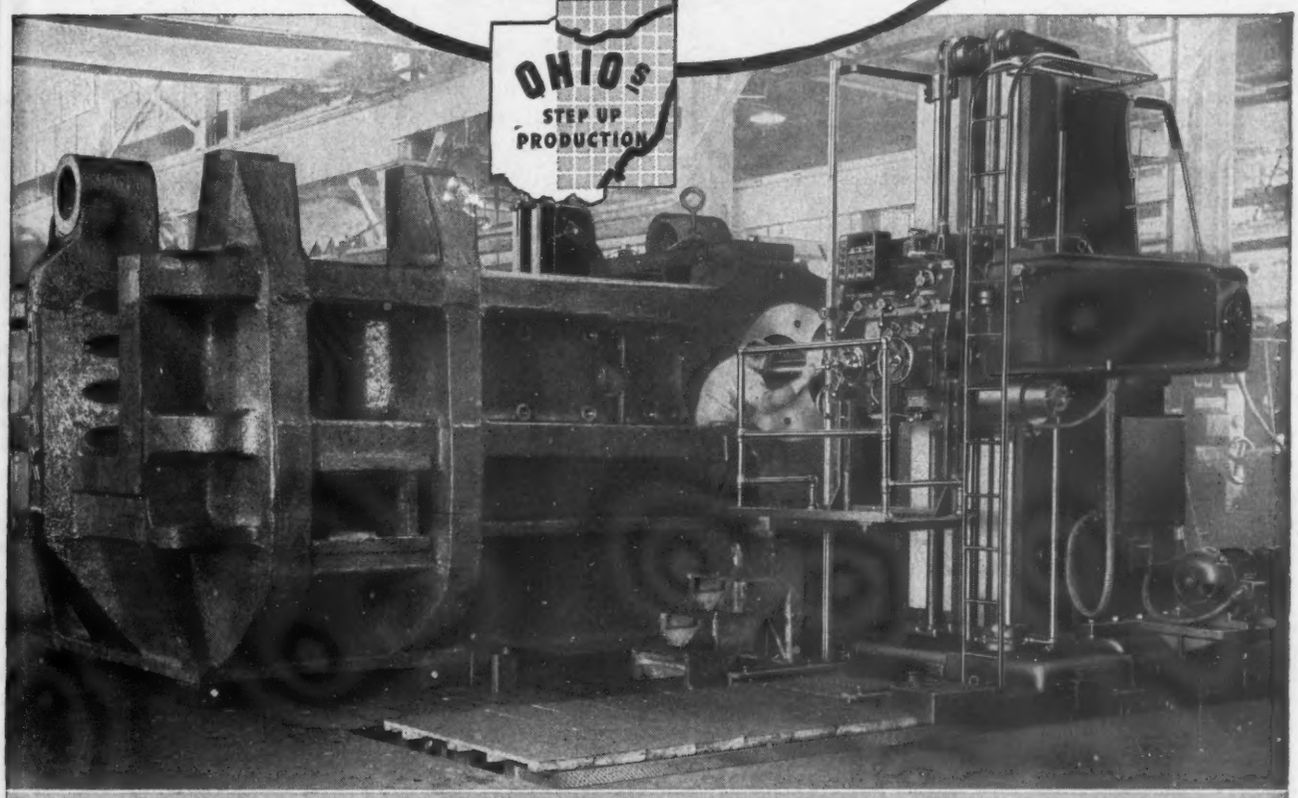
Each part of the book has a complete subject index, from 36 to 44 pages. There are two extensive tables of contents, the first listing all standards under general materials headings and the second according to the serial designations of the standards.

To keep the books up to date, a supplement will be issued to each part late in 1945. As a service with the 1944 Book of Standards, there is a complete 200-page Index to Standards, furnished without additional charge, a copy accompanying each part of complete set.

The Society has issued a separate volume on Chemical Analysis of Metals, including standards and recommendations for both ferrous and nonferrous metals. These methods are not included in the Book of Standards.

OHIO HORIZONTAL

BORING, DRILLING AND MILLING MACHINES



Ohio Horizontal extra heavy duty Boring, Drilling and Milling Machine (floor type) bores steel bed frame of 8" Ajax Forging Machine for crankshaft bearing sleeves. Work done fast, accurately, profitably.— Photograph by courtesy of The Ajax Manufacturing Company, Cleveland, Ohio.

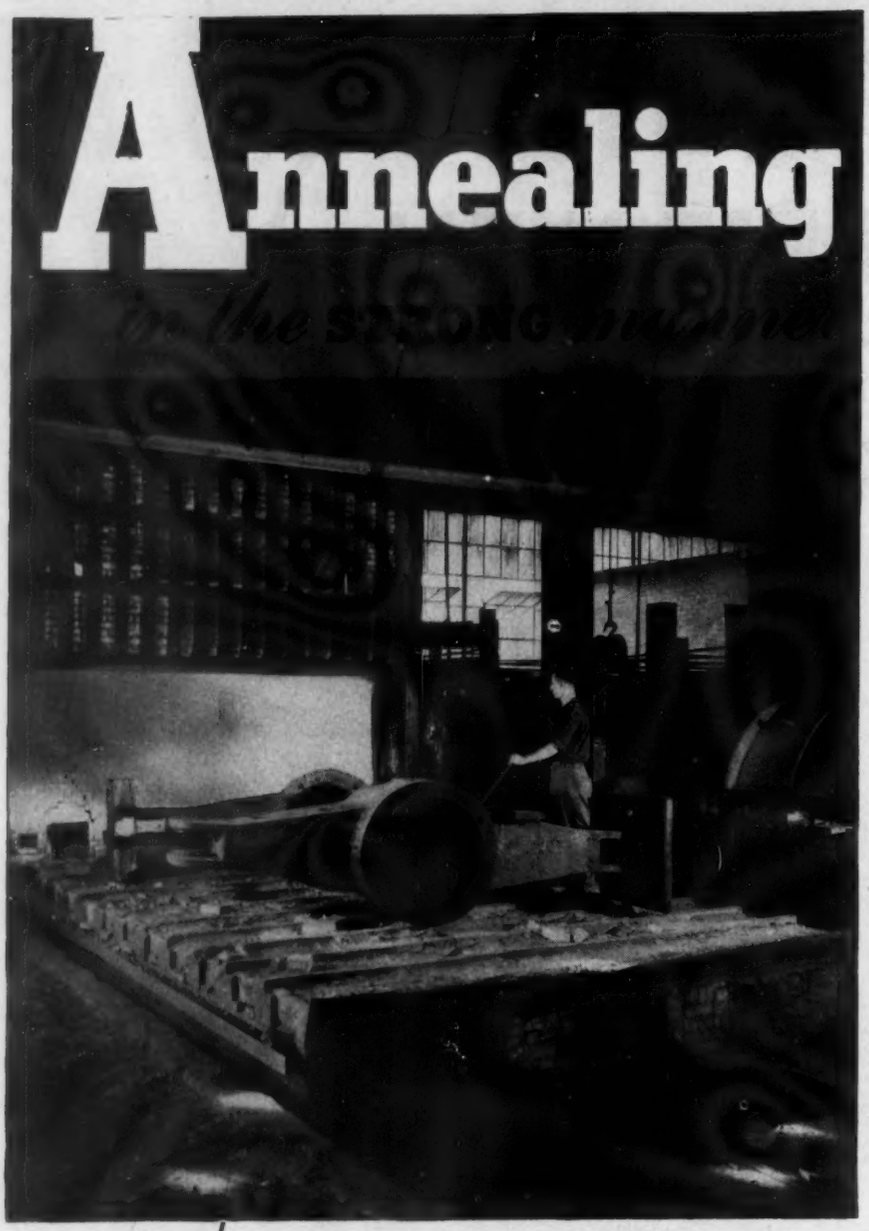
When America's first all-anti-friction boring, drilling and milling machine appeared it bore the name of Ohio. Ever since, we have endeavored steadily to add new features worthy of this precedent. Example: *a portable control feature which enables the operator to get more work done in less time v ith less effort.* Other features: nitrided spindle, narrow guides, internal gear-tooth type clutches, unit construction, anti-friction bearings, built-in rapid traverse to spindle and all other parts, continuous spindle feed of 72" with full-length spindle support, push-button control. Floor and table types in both heavy duty and extra heavy duty models . . . Ask for a copy of our well illustrated Bulletin 300.

THE OHIO MACHINE TOOL COMPANY, KENTON, OHIO

Orders for Ohio Horizontals are being shipped with reasonable promptness.

OHIO DREADNAUGHT

HORIZONTAL BORING, DRILLING AND MILLING MACHINES • SHAPERS • PLANERS



USERS OF STRONG STEEL CASTINGS *are keenly aware of how much they gain in the elimination of internal stresses by the Strong heat-treating and annealing processes. The car annealing furnace shown above is 12 feet wide by 14 feet long. It is oil fired and controlled by recording pyrometer.*

Wherever it is desirable, Strong double anneals its castings for extra protection. Strong also uses a pit type annealing furnace, oil fired with heat recorder control. Strong can tell a host of vital facts about heat-treating every steel casting buyer should know. Just ask for them.

STRONG IN NAME
STRONG IN FACT

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N.Y.

Strong

TENSILE STRENGTH · ELONGATION

Rewinding Equipment

(*Concluded from Page* 149)

devices to control. These include:

1—A *slow* button brings the bobbin to a creep speed for slowly taking up any slack wire after two ends of different wire lengths have been brazed together.

2—A *fast* button to accelerate the bobbin and swift to full running wire speed, with current limit control of the bobbin motor.

3—A *stop* button to dynamically brake the bobbin motor.

4—An adjustable braking rheostat "B" (Fig. 4) for changing wire tension with different wire sizes.

5—A small rheostat "A" for compensating for different swift core diameters. Usually the rheostat remains in one position.

Swing-Aside Furnace Facilitates Charging

A new type of swing-aside, top charge, electric furnace with hydraulic, air counter-balanced, electrode positioning control has been developed by Whiting Corp., Harvey, Ill. Design features the use of small cylinders of standard make to raise and swing the roof. Weights of electrodes, electrode arms, and electrode arm supports are not supported by furnace refractories, but are suspended from the swing column at side of furnace at all times. Weight of roof only (which is picked up at four points) is distributed uniformly and symmetrically over the entire periphery of the wall refractory. Furnace capacity is 12,000 lb and it has a melting rate of from 6000 to 8400 lb per hr and uses a 3000-kv transformer.

Fire Extinguishing Guide

A "Fire Extinguisher Installation Guide" has been prepared by Randolph Laboratories Inc., 8 East Kinzie, Chicago 11, to help mobilize employe firefighting units. This gum-edged, 8½ x 20-in. chart attracts employes' attention and illustrates which extinguishers should be used and installed for different kinds of fires. Fires are divided into standard A, B and C classifications, and typical fires in each division are illustrated. Also pictured are extinguishers to be used, including carbon dioxide, vaporizing liquid (carbon tetrachloride), soda-acid, foam, and pump tanks. Guide is designed for notebook insertion as well as wall-posting and can be filed as reference for plant safety departments, fire-fighting schools, employe demonstrations, etc. Copies may be obtained by writing the company.

—o—

Research data from many departments of technical schools and universities is being made available by National Research Bureau Inc., 415 North Dearborn street, Chicago 10. Master theses will be indexed in *Digest-Index*, and supplied on microfilm.

Prices based on first 66 months of both wars
Source: Bureau of Labor Statistics

Rationing, price and wage controls have held prices down . . . *but the next step is up to you!*

The silliest man (or woman) in America today is the one who thinks he's ahead of the game when he finds a way around the rules of rationing.

Why is he silly?

Because every time you pay more than ceiling prices, every time you buy rationed goods without stamps, you are breaking down the very controls that have kept your cost of living lower in this war than in World War I.

What else can you do to keep prices down? Tuck away every dollar you can get your hands on. Put it safely away into War Bonds, life insurance, banks.

Why? With more money in people's pockets than goods to spend it on—every unnecessary thing you buy tends to push prices up.

Save. Don't spend. It's common sense for today—safety for tomorrow.

ONE PERSON CAN START IT!

You give inflation a boost . . .

—when you buy anything you can do without

—when you buy above ceiling or without giving up stamps (Black Market)

—when you ask more money for your services or the goods you sell.

SAVE YOUR MONEY. Buy and hold all the War Bonds you can afford—to pay for the war and protect your own future. Keep up your insurance.

HELP US KEEP PRICES DOWN

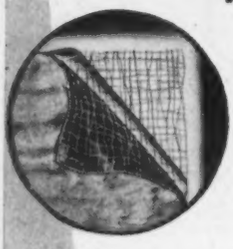
A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

Put This at the Top of Your Immediate "Check List"

Investigate... how Fibreen cuts Packaging Costs

Time Tested . . . Field Tested

FIBREEN



Does a *Better* Packaging Job

Sisal fibre reenforcement for strength — special asphalt for water-proofness — kraft paper to make it scuff-proof—sealed by heat and pressure to produce Fibreen.

Hundreds of manufacturers in practically every industry are saving time, material, freight or handling costs by using Fibreen. They have simplified their shipping room procedure . . . given their products better protection against moisture and dirt damage . . . cut damage claims by assuring shipments arriving at destination in good condition. In many cases, products wrapped in Fibreen go forward on open cars . . . in others, crates replace boxes. Shipping is more compact . . . weight is eliminated . . . more units can be gotten into minimum cars.

Many Uses for Tough, Moisture-Proof Fibreen

Fibreen is now busy with war packaging. Nevertheless, investigate the full possibilities as applied to your shipping problems . . . as lining for crates and cases, for bags . . . to wrap small, large, heavy, or light bales, and odd shaped packages, etc. . . . for LCL, express, or carload shipments.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY
In Canada Write to Alexander Murray & Co., Limited, at Montreal · Toronto · Halifax · Saint John · Winnipeg · Vancouver

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X SISALTAPE AND COPPER-ARMORED SISALKRAFT

High Head Turbine

(*Concluded from Page* 150)

Mexico is only a fraction of the weight of the larger unit.

Although the Tilostoc River flows to a lower level in the vicinity of the hydroelectric power site, engineers in designing the plant decided to dam its waters and to tap them at a far higher level beyond the mountain. Here they built a diversion dam directing river waters through an open canal to a settling basin, where quiet water permits sand content to precipitate to the bottom. From this basin water is conducted through a large pressure tunnel to a vertical surge tank, which is connected to three steel pipes, called penstocks. These penstocks feed the turbines in the power plant below.

Glass-Base Plastic Is Flame, Arc Resistant

A glass-base plastic, known technically as glass melamine laminate, made from a fine weave, is being manufactured in sheets by Formica Insulation Co., Cincinnati. It is a continuous filament fiberglass fabric with melamine thermosetting resin, which is said to be more resistant to flame and to arcing than resins ordinarily used in standard grades of laminated material.

Material is available in sheets, tubes and rods and is designed for electrical applications requiring a high order of flame and fire resistance, together with a high arc resistance and high mechanical strength.

Flexible Connectors Offer Permanent Tightness

Flexible connectors for use in chemical, petroleum and power plants to aid in solving the problem of expansion, contraction and deflection in the various planes of pipe lines have been developed by Zollea Bros. and Johnson, Wilmington, Del. Corrosive liquids and gases under pressure up to 30 psi, at temperatures ranging from subzero to 1800°F can be handled by connectors. Units are made of carbon steel, stainless steel, or other corrosion-resistant alloys and are corrugated circumferentially. They are 6 inches or larger in diameter. Permanent tightness is said to be achieved without packing. Connectors are made for pressures up to 300 psi for absorbing linear expansion.

—o—

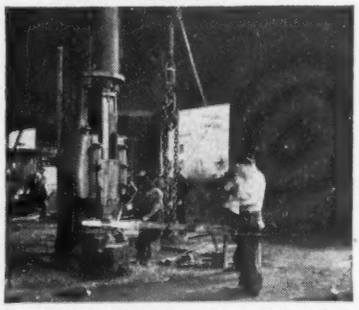
Use of a spray gun for recoating polishing wheels and belts is said to make for faster production in setting up wheels and belts and a more uniform wheel or abrasive belt, giving a better finish. This method, using a spray gun with Nuglu, made by J. J. Siefen Co., Detroit 9, can be adapted to many recoating problems. Material also may be applied by brushing.

JOHNSTON & JENNINGS HAMMERED FORGINGS

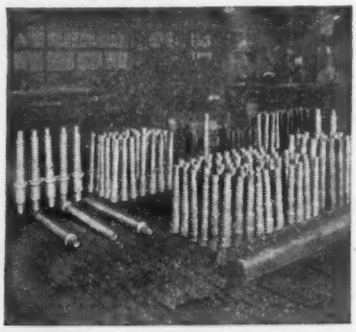
For Machine Tool and Other Requirements

● Complete facilities, and demonstrated ability to deliver the work *when* you want it, *as* you want it, has enabled Johnston & Jennings to serve many of the country's largest, nationally known machine tool, gear, turbine, road building, diesel engine and other manufacturers as their principal, sometimes their sole source of supply.

Arbors and spindles are swaged when hot, thus assuring a high degree of concentricity and smoothness of the finished piece. All work to be turned is regularly sawed and centered ready for machining operations,– and our demonstrated ability to work to low forging tolerances, reduces to a minimum the amount of metal to be removed, saving time and cutting costs. Send for Bulletin No. 421–It gives full details–and "Check with J & J" on your next forging job.



▲ *Above:*–Hot Swaging a Machine Tool Spindle in Cylindrical Shaped Dies. *Below:*–Group of J & J Milling Machine and Grinder Spindles, Forged, Sawed, Centered and Shot Blasted. ▼



THE JOHNSTON & JENNINGS CO.

905 Addison Road • Cleveland 14, Ohio

HAMMERED FORGINGS, HOLLOW BORING AND ALLIED SERVICES

THE BUSINESS TREND

Review of War Needs Awaited by Business

QUESTION uppermost in the minds of businessmen today is: How rapidly will munitions production decline? Upon the answer to that question rests much of the planning necessary to prompt and widespread diversion of manufacturing facilities, resources and manpower to civilian goods production. Despite fairly heavy cutbacks in munitions orders, the pace of reconversion since V-E Day has been relatively slow and until such time as military requirements for the Pacific war are definitely known there is little prospect that transition to peacetime activity will be accelerated materially.

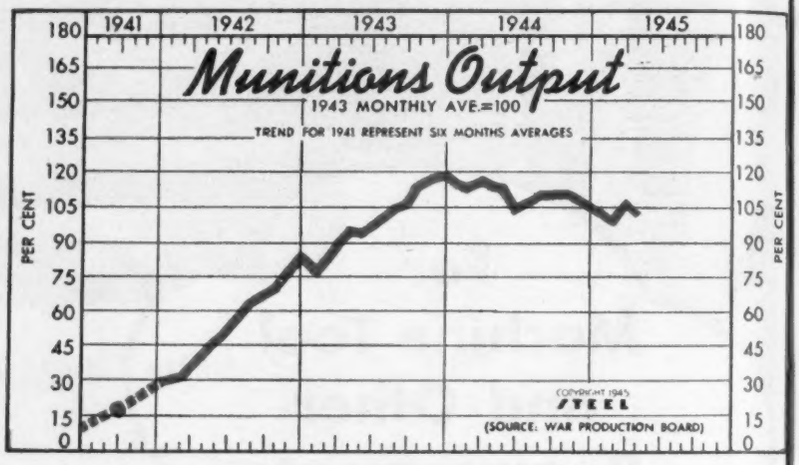
This does not mean progress isn't being made. It does mean, however, that reconversion is being stalled in various directions by factors which must be eliminated soon if substantial unemployment resulting from military order cutbacks is to be avoided. This fear of unemployment is reflected in recent governmental moves, among them President Truman's request to Congress to provide greater unemployment compensation for those disemployed in the reconversion period.

Although the change from a two-front to a one-front war is reflected in a downtrend in munitions production, manufacturing continues, for the most part, to be confined to production of essential war materials. New order volume in most industries is large but materials and labor remain scarce.

Industrial output generally shows a downward trend but it continues at a high level. Steel ingot production dropped 2 per cent, and the daily average bituminous coal production rose 72,000 tons during the latest week. However, construction volume fell $13.6 million in that period. Transactions on the New York Stock Exchange in May indicated an increase in the absorption of idle funds by the securities markets.

CASTINGS—Shipments of gray iron castings during March amounted to 857,616 short tons, increase of 14 per cent over the 752,266 short tons shipped in February, and an increase of 3 per cent from the 828,648 tons shipped in March, 1944. Unfilled orders at the end of March, 1945, totaled 2,713,656 tons. Production of malleable castings for April, 1945, amounted to 77,042 short tons, compared with 86,175 tons for March, and 69,820 tons for April, 1944.

COKE—Production of by-product and beehive coke in the United States during April totaled 5,601,242 net tons, decrease of 575,058 tons compared with March output. Stocks of by-product coke at producers' plants again decreased and were 43,365 tons less on May 1 than on April 1, reducing stocks to the equivalent of 3.6 days' production.



WPB's Munitions Output Index
(Ave. Month, 1943 = 100)

	1940	1941	1942	1943	1944	1945
January	..		29	79	112	103
February	..		31	82	111	100
March	..		36	90	115	106
April	..	12	43	97	111	102*
May	..		48	95	111	...
June	..		53	97	104	...
July			59	101	106	...
August			66	105	108	...
September			69	106	108	...
October	6	17	70	114	108	...
November			78	117	106	...
December			85	117	105	...

* Estimated.

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	91.5	93.5	95.0	98.5
Electric Power Distributed (million kilowatt hours)	4,204	4,330	4,397	4,144
Bituminous Coal Production (daily av.—1000 tons)	1,965	1,893	1,875	2,047
Petroleum Production (daily av.—1000 bbls.)	4,859	4,867	4,839	4,523
Construction Volume (ENR—unit $1,000,000)	$21.4	$35.0	$40.6	$23.2
Automobile and Truck Output (Ward's—number units)	18,100	21,010	20,470	16,950

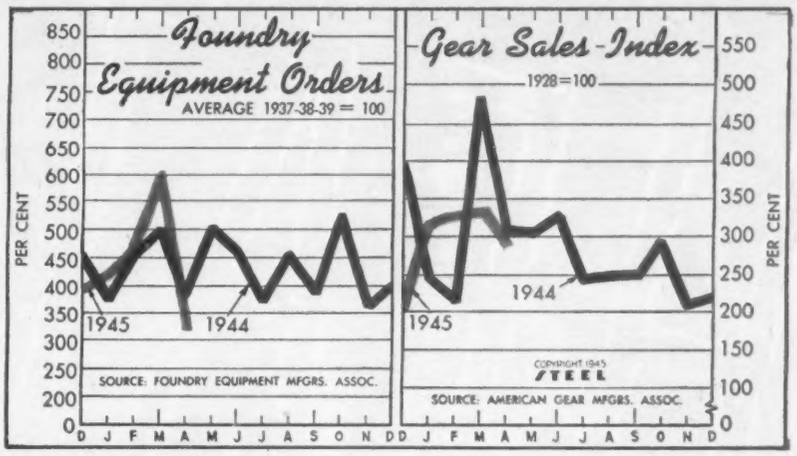
*Dates on request.

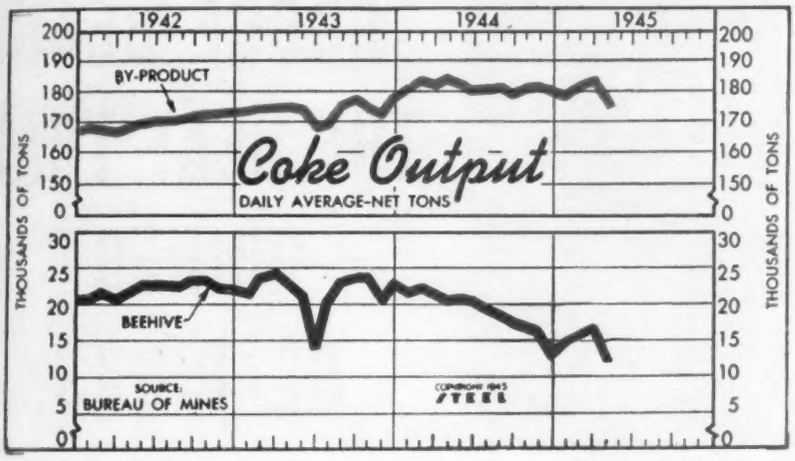
TRADE				
Freight Carloadings (unit—1000 cars)	844†	882	863	811
Business Failures (Dun & Bradstreet, number)	13	12	23	22
Money in Circulation (in millions of dollars)‡	$26,500	$26,399	$26,204	$22,112
Department Store Sales (change from like week a year ago)‡	none	−1%	+18%	+15%

†Preliminary. ‡Federal Reserve Board.

Foundry Equipment Orders — Gear Sales

	Foundry Equipment Orders — Monthly Average (1937-38-39=100)			Gear Sales — Index (1928=100)		
	1945	1944	1943	1945	1944	1943
Jan.	422.4	442.8	429.8	323	246	268
Feb.	465.3	378.3	399.5	331	214	303
Mar.	604.7	498.4	562.7	339	485	334
Apr.	325.0	385.7	362.7	296	308	240
May	....	503.9	348.9	...	305	342
June	....	466.1	413.6	...	328	401
July	....	375.8	379.4	...	242	374
Aug.	....	450.5	390.4	...	247	312
Sept.	....	388.0	346.6	...	248	320
Oct.	....	526.5	436.6	...	293	368
Nov.	....	369.5	388.0	...	209	387
Dec.	....	397.4	442.8	...	219	387
Avg.	....	426.9	440.3	...	279	336





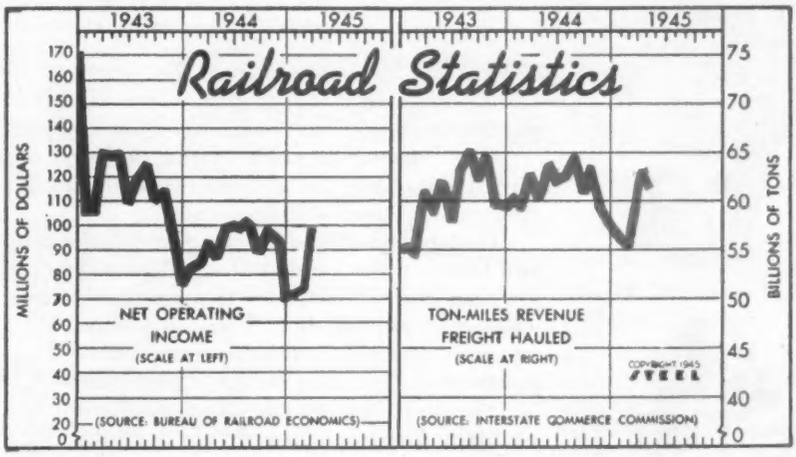
Coke Output

Bureau of Mines
(Daily Average—Net Tons)

	By-Product		Beehive	
	1945	1944	1945	1944
Jan.	179,879	181,501	14,745	21,933
Feb.	180,727	184,384	16,210	22,248
March	182,120	182,442	17,115	21,529
April	174,239	185,259	12,469	20,457
May	.....	184,071	.....	20,783
June	.....	181,891	.....	20,472
July	.....	181,506	.....	19,531
Aug.	.....	181,718	.....	18,572
Sept.	.....	179,234	.....	17,305
Oct.	.....	181,772	.....	16,994
Nov.	.....	182,383	.....	16,199
Dec.	.....	180,746	.....	13,066
Ave.	.....	182,359	.....	19,128

Statistics of Class I Railroads

	Net Operating Income (millions)			Ton-Miles Revenue Freight (billions)		
	1945	1944	1943	1945	1944	1943
Jan.	$73.0	$84.9	$105.3	56.8	60.5	55.1
Feb.	73.2	84.5	105.8	55.3	59.3	54.4
Mar.	99.9	92.5	129.7	62.9	62.7	61.2
Apr.	...	87.7	128.7	62.3	60.4	59.1
May	...	98.5	129.5	...	64 0	62.1
June	...	99.8	109.0	...	62.0	58.0
July	...	98.6	127.8	...	62.8	63.7
Aug.	...	101.4	132.3	...	64.5	65.1
Sept.	...	89.1	110.3	...	61.0	62.5
Oct.	...	97.3	113.1	...	63.5	65.0
Nov.	...	91.6	96.4	...	59.4	59.9
Dec.	...	69.8	76.9	...	57.3	60.6
Ave.	...	$93.1	$113.5	...	61.5	60.6



FINANCE

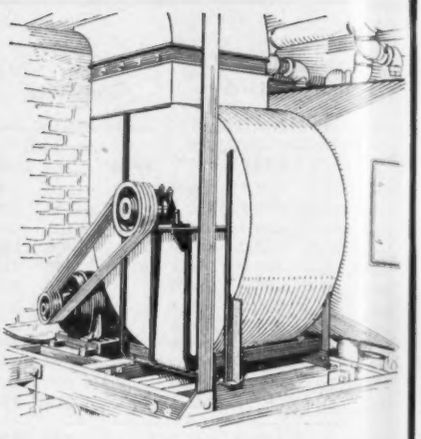
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$8,498	$11,109	$11,039	$7.819
Federal Gross Debt (billions)	$239.2	$238 2	$235.1	$188.0
Bond Volume, NYSE (millions)	$47.4	$43.6	$83.8	$52.6
Stocks Sales, NYSE (thousands)	6,795	6,407	7,853	4,293
Loans and Investments (billions)†	$57.5	$57 2	$57.1	$50.2
United States Gov't. Obligations Held (millions)†	$42,897	$42,853	$42,854	$37,184

†Member banks, Federal Reserve System.

PRICES

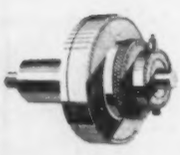
STEEL's composite finished steel price average	$58.27	$58.27	$57.55	$56.73
All Commodities†	105.9	105.8	105.7	103.9
Industrial Raw Materials†	118.5	117.9	118.2	113.6
Manufactured Products†	102.1	102.1	101.9	101.1

†Bureau of Labor's Index, 1926 = 100.



DODGE BEAT THE HEAT THAT RUINED BEARINGS

THE RIGHT DRIVE FOR THE JOB



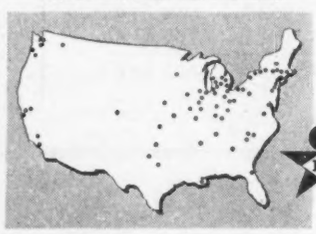
TO SAVE TIME in drying fine papers, the Strathmore Paper Co., West Springfield, Mass., installed a battery of warm air blowers. The heat applied directly to finished paper cut the drying time but created a prohibitive maintenance problem.

One bearing in each of the blowers, of necessity, was inside the blower housing, directly opposite the source of heat. Result: lubrication difficulty, bearing failure, and frequent replacement required!

Dodge Transmissioneering saved the situation. Operating conditions were analyzed and Dodge water cooled Sleevoil precision pillow blocks prescribed. Specifically designed for operation in elevated temperatures, these Dodge bearings now carry the power load efficiently, dependably. Thus an industry saves precious production time, cuts power costs, by using Dodge experience.

For help on power transmission problems in your plant, or applications to your product—for up-to-the-minute news on power drives—call a Transmissioneer, the Dodge distributor in your territory, or write to the

Copyright 1945 Dodge Mfg. Corporation



There are 210 Dodge factory graduate Transmissioneers, located in principal cities, to show you new and better ways of transmitting power.

Sign of the Dodge Transmissioneer

DODGE MANUFACTURING CORPORATION, MISHAWAKA, INDIANA

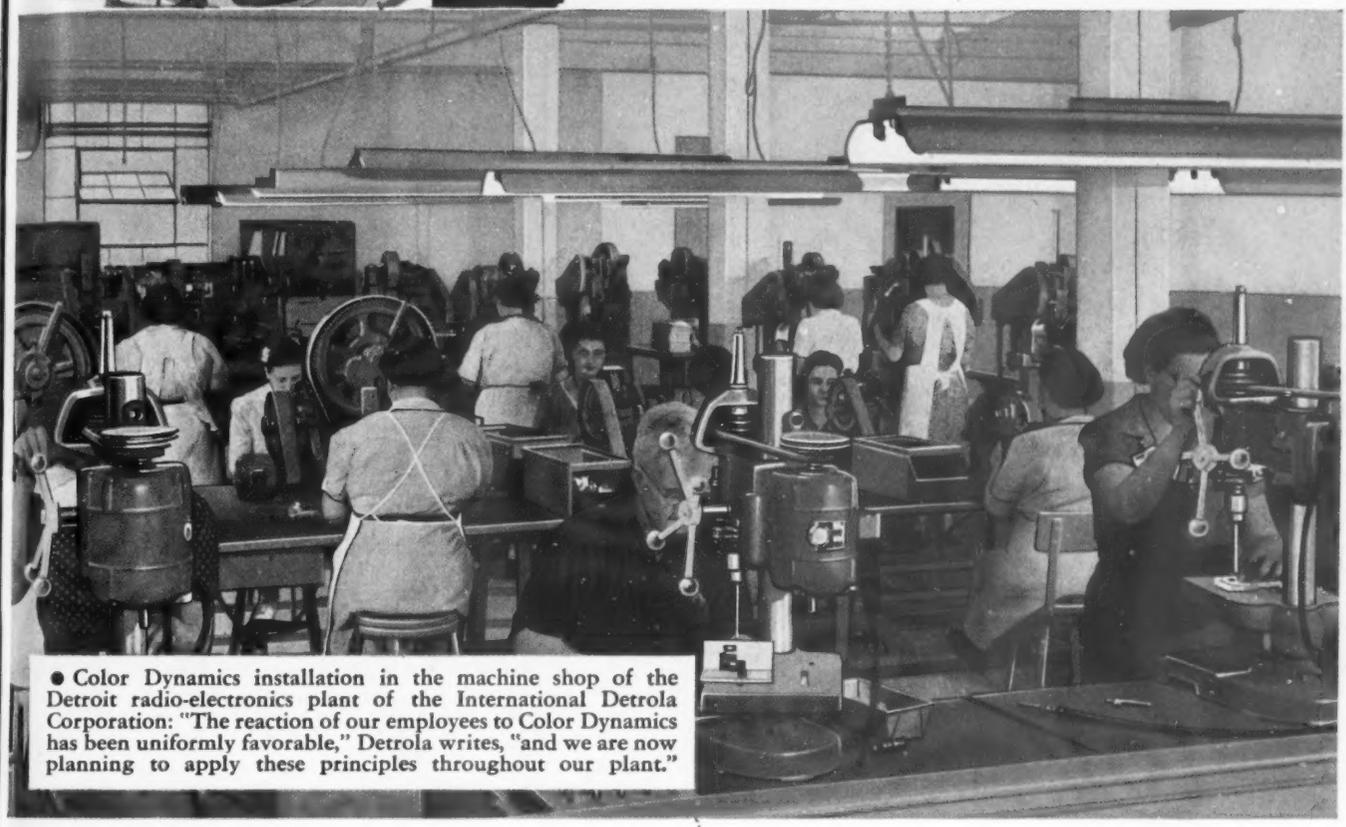
DODGE
MISHAWAKA

TRANSMISSIONEERED MEANS ADVANCED DESIGN IN POWER DRIVES

For Increased Efficiency Include Pittsburgh's

Color Dynamics

In Your Reconversion Plans



● Color Dynamics installation in the machine shop of the Detroit radio-electronics plant of the International Detrola Corporation: "The reaction of our employees to Color Dynamics has been uniformly favorable," Detrola writes, "and we are now planning to apply these principles throughout our plant."

Color Dynamics

—scientific utilization of energy in color to build up the morale of workers—to reduce fatigue, absenteeism and accidents—to improve quality and quantity of production.

THESE DAYS . . . the alert manufacturer considers carefully every development—no matter how new or unusual—which will help him build more and better goods at lower cost!

Color Dynamics is new . . . is unusual—but within a year's time it has achieved remarkable success because it is based upon the reactions of human beings to energy in color.

That's why Pittsburgh's new science of COLOR DYNAMICS is winning more and more attention in many industries . . . for current operations . . . and in reconversion plans.

Its basic principles have been applied in hundreds of plants—most of them leaders in their fields.

In the plants where these principles have been used more work per man-hour and more man-hours per man have been the result!

Pittsburgh has worked out special methods to utilize this energy in color on every paintable surface—machines, floors, walls, ceilings and mobile equipment!

By such purposeful uses of color, plant efficiency is increased. Workers' eye fatigue is lessened. Absenteeism is reduced. Accidents are prevented. The quality and quantity of production are improved.

Color Dynamics may be applied gradually in your plant—as part of your normal maintenance operations. A copy of our book, "Color Dynamics", will be sent to business executives upon request on company letterhead. Write Pittsburgh Plate Glass Co., Paint Division, Dept. ST-6, Pittsburgh 22, Pennsylvania.

PPG

PITTSBURGH PAINTS

PITTSBURGH PLATE GLASS COMPANY, PITTSBURGH, PA.

PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

Preformed wire rope

SAVES REPLACEMENT 3 WAYS

Since preformed wire rope lasts longer, obviously it reduces frequency of replacing the rope itself. Not quite so obvious, but equally important, is the ease with which preformed wire rope adjusts itself to different uses. Because of its ready adaptability—its resistance to rotating in sheave grooves and its better spooling qualities—preformed postpones the replacement of machine parts or shut-downs for repairing. A third way in which preformed wire rope saves replacement is with the men on the job. As preformed rope is safer to handle it reduces lost-time accidents. Make certain your next wire rope is preformed.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

Industry Sees Less Cut Than Expected in Steel

Heavy civilian needs may cushion war cutbacks . . . New WPB order will aid transition . . . Source of sheets for automobiles in doubt

STEELMAKERS in general are optimistic as to production outlook and the opinion prevails that ingot production is not likely to drop below 85 per cent of capacity before the end of the Pacific war, with the principal decline likely to come this summer.

The industry has not yet felt the full force of military cutbacks made since the fall of Germany and developments cannot be gaged accurately what may develop soon with respect to further curtailments in the war program. The opinion that there will be no drastic curtailment is based on the known heavy volume of civilian work available to fill the gaps in most lines as rapidly as conditions permit. These conditions are becoming more favorable with relaxation of government restrictions. Less essential unrated tonnage is expected to cushion the decline in plates over third quarter, with shapes and possibly alloy steel production also benefiting from unrated work.

Much speculation exists as to where sheets will come from for even the moderate number of 200,000 automobiles scheduled to be built before the end of the year. Estimates place sheet requirements for these cars at 100,000 to 150,000 tons, with somewhat more hot-rolled than cold-rolled. Most producers of hot-rolled pickled sheets and cold-rolled sheets are booked solidly into December and early next year on rated tonnage.

War Production Board is concerned over failure of contractors in many cases to cancel steel contracts when government work for which it was ordered has been cut back. It is estimated mills books now contain hundreds of thousands of tons of steel for third quarter delivery on which products for which it was bought have been canceled. To ferret out this steel and urge cancellation of such tonnages, to make steel available for civilian use by reconverted plants WPB is working through its field offices to urge contractors to cancel such tonnage. The Army is also acting through its procurement division to the same end.

War Production Board has authorized construction of 407 passenger cars ordered some time ago and later held up. Railroad car buying is increasing, for both domestic and export purposes. Bids on cars for France and India, to be taken by the War Department, have been postponed to June 22. These orders aggregate 42,750 cars.

Due mainly to a strike shutting down production at plants of the Tennessee Coal, Iron & Railroad Corp. in the Birmingham district the estimated national production rate last week declined 1½ points to 90 per cent of capacity. The Birmingham rate dropped to 26 per cent, Chicago eased two points to 95 per cent and Pittsburgh lost ½-point to 90 per cent. Cincinnati advanced 5 points to 89 per cent, Youngstown 5 points to 85 and Wheeling 6 points to 95½ per cent. Rates were unchanged as follows: Buffalo, 90½; New England, 90; St. Louis, 75; Detroit, 83; Cleveland, 91; eastern Pennsylvania, 92.

Movement of Lake Superior iron ore in May totaled 11,121,203 gross tons, which was 993,008 tons below May shipments last year. However, with April shipments much heavier than in the corresponding month last year total tonnage shipped in the two months was 1,000,987 tons greater than a year ago.

Scrap continues well balanced with needs and prices are well maintained except for borings and turnings. For most part melters are in good position but yard stocks are not large and collections are light. Labor still is a factor in preparing material for shipment and dealers avoid accumulation.

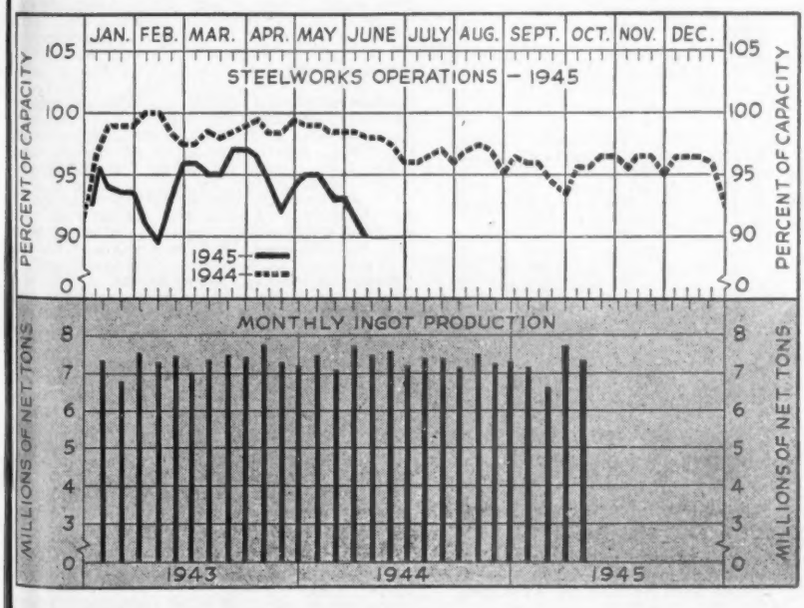
Average composite prices of steel and iron products are steady at Office of Price Administration ceilings, except for steelmaking scrap, which is a shade under ceiling. Finished steel composite remains at $58.27, semifinished steel at $37.80 and steelmaking pig iron at $24.05. Steelmaking scrap holds at $19.00.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 9	Change	Same Week 1944	Same Week 1943
Pittsburgh	90	—0.5	92	90
Chicago	95	—2	101.5	97
Eastern Pa.	92	None	94	95
Youngstown	85	+5	95	97
Wheeling	95.5	+6	92	86
Cleveland	91	None	90	95
Buffalo	90.5	None	90.5	90.5
Birmingham	26	—64	95	95
New England	90	None	90	95
Cincinnati	89	+5	87	88
St. Louis	75	None	79.5	93
Detroit	83	None	88	83
Estimated national rate	90	—1.5	*98	*96.5

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	June 9	June 2	May 26	One Month Ago May, 1945	Three Months Ago Mar., 1945	One Year Ago June, 1944	Five Years Ago June, 1940
Finished Steel	$58.27	$58.27	$58.27	$57.73	$57.55	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	36.45	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	22.05
Steelmaking Scrap	19.00	19.00	19.00	19.13	19.17	19.17	19.15

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	June 9, 1945	May, 1945	Mar., 1945	June, 1944
Steel bars, Pittsburgh	2.25c	2.17c	2.15c	2.15c
Steel bars, Chicago	2.25	2.17	2.15	2.15
Steel bars, Philadelphia	2.57	2.49	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.22	2.20	2.10
Plates, Philadelphia	2.30	2.26	2.25	2.15
Plates, Chicago	2.25	2.22	2.20	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.65	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.65	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.64	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.82	2.80	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$34.50	$34.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	34.50	34.00	34.00
Rerolling billets, Pittsburgh	36.00	34.50	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts	2.15	2.05	2.00	2.00

Pig Iron	June 9, 1945	May, 1945	Mar., 1945	June, 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	26.34	25.84
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.56	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.50	$7.00	$7.00	$7.00
Connellsville, foundry ovens	8.25	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham. No. 5—$\frac{9}{32}$ in. inclusive, per 100 lbs., $2.15. Do., over $\frac{9}{32}$—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.35	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.75c
Spring wire 3.20c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports .....$3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Birmingham, Cleveland, Duluth 3.55c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	⅜	34	16
¾	66½	55	1-1¼	38	18½
1-3	68½	57½	1½	37½	18

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1⅓"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
...	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27 00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25 50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅝ and ⅝ x 6-in. and shorter... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c
⅞-inch and under ..... 65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.....$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.35
Philadelphia, delivered	12.88

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945.
†13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[12]	4.872[25]	4.072[21]	4.772	5.816[25]	5.860[25]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[16]	4.40[10]	3.75[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.65[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.75[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.800[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.443[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[20]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[26]	4.10[10]	3.65[23]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.583[23]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.333[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.533[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.783[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.783[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, or dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del.				
No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. ‡For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97. (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base).....$30.50

6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $66.55

First Quality

Pa., Ill., Md., Mo., Ky.	52.85
Alabama, Georgia	52.85
New Jersey	57.70
Ohio	46.35

Second Quality

Pa., Ill., Md., Mo., Ky.	47.90
Alabama, Georgia	39.15
New Jersey	50.50
Ohio	37.10

Malleable Bung Brick

All bases 61.65

Silica Brick

Pennsylvania	52.65
Joliet, E. Chicago	60.65
Birmingham, Ala.	52.85

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	31.95
Wire cut	29.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.60c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 16.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0665c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots, 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.25
No. 2 Heavy Melt. Steel	18.25
No. 2 Bundles	15.75-16.25
No. 3 Bundles	13.75-14.25
Mixed Borings, Turnings	9.50
Machine Shop Turnings	9.50
No. 2 Busheling	12.50
Billet, Forge Crops	20.75-21.25
Bar Crops, Plate Scrap	20.75-21.25
Cast Steel	20.75-21.25
Punchings	20.75-21.25
Elec. Furnace Bundles	18.75
Heavy Turnings	17.00

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$14.33-15.33
No. 2 Heavy Melt. Steel	14.33-15.33
No. 2 Hyd. Bundles	12.83-15.33
No. 3 Hyd. Bundles	10.83
Chemical Borings	14.33
Machine Turnings	6.50
Mixed Borings, Turnings	6.50
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.00-11.50
Short Shovel Turnings	14.00-14.50
Mixed Borings, Turnings	12.00-12.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.00-13.50
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	13.06-14.06
No. 1 Busheling	13.06-14.06
Machine Shop Turnings	5.50
Mixed Borings, Turnings	5.50
Short Shovel Turnings	7.50- 8.50
Chemical Borings	13.06
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	15.00-15.50
Cast Iron Borings	14.00-14.50
Machine Shop Turnings	11.50-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-11.50

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	16.25-18.50
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	10.50-11.50
Mix. Borings, Sht. Turn.	12.00-12.50
Short Shovel Turnings	12.00-12.50
Cast Iron Borings	12.00-12.50
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	12.00
Short Shovel Turnings	14.00
Mixed Borings, Turn.	12.00
Cast Iron Borings	13.00
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	7.00- 7.50
Short Shovel. Turnings	10.50-11.00
Cast Iron Borings	9.50-10.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	6.50- 7.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.50
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

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NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum; 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ¼c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c. (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 202

Sheet cancellations have little effect on nearby bookings but backlogs are shrinking from removal of tonnage booked for remote shipment. Considerable tonnage on unrated orders is being booked but as promises are not made as to shipment this is not counted in backlogs, CMP tonnage having preference. Stainless sheets are available in August, but galvanized range from November into first quarter. Silicon sheets are becoming more deferred, though sometimes available this year.

New York—Hot and cold-rolled sheets are still being offered for delivery around December and January, indicating a continued shrinkage in backlogs. There is demand for "free" tonnage, but this is not reflected in the delivery schedules since firm promises cannot be made, because of priority of CMP requirements. Galvanized sheet promises still range from November until well into first quarter of next year, depending upon the gage and size and the order books of the various individual producers.

Stainless steel deliveries have actually eased to the point where they are now being offered in August and in one instance as early as July. This is believed to be a reflection of further cutbacks in the aircraft program. On the other hand, silicon sheet deliveries are becoming increasingly extended. In some instances heavy silicon sheets can still be had this year, but they are farther away than a week ago and in lighter silicon sheets deliveries in some cases run well into second quarter of next year. While military requirements are the principal contributing factor, sellers look for heavy demand for general commercial purposes to take up the slack once cutbacks start in military needs.

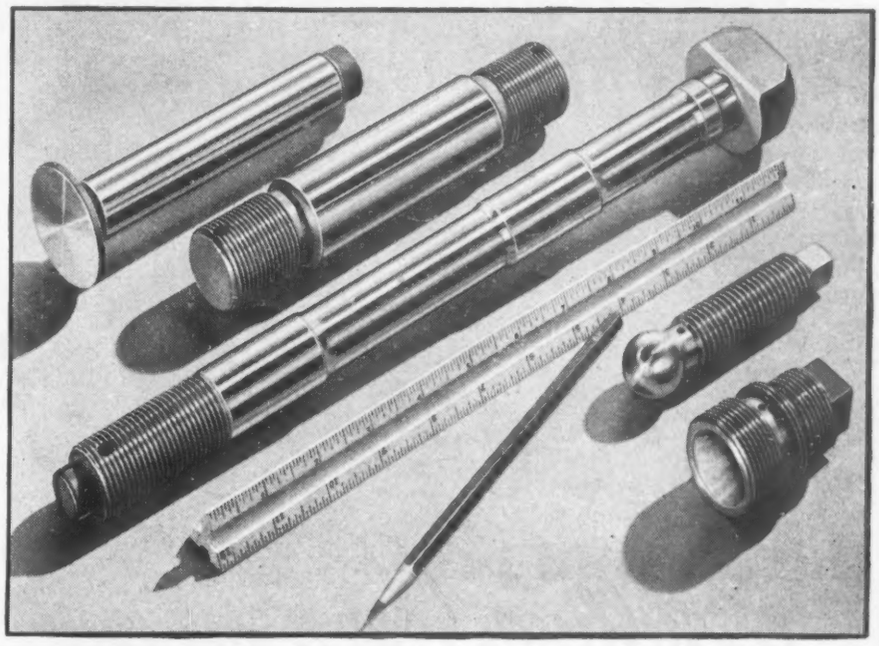
Producers foresee an increase in packaging requirements as a result of expanding movement of munitions to the Far East. Whereas the movement of munitions from this country to Europe usually required a matter of 10 to 14 days, about 17 days at the very outside in the case of especially slow moving convoys, the shipment of materials from this country to the Far East will require several weeks, and as for the shipment of munitions from Europe to the Far East, the time may involve 10 or 12 weeks. Light gage black sheets, long ternes and galvanized sheets, especially the latter two, are expected to be required in increasing volume for packaging.

Cleveland — Fairly quiet conditions prevail in the flat-rolled steel market. While there are some cancellations they mean little and a leading producer is taking more new business than is being canceled. Civilian orders are heavier and while mills cannot schedule them for rolling or promise delivery they are being added to backlog tonnage. Important steelmakers here are sold into January and February and have nothing to promise for any delivery this year. Automotive sheet consumers are becoming restive but apparently have little hope of obtaining tonnage unless rated orders are filed.

Boston — New rated orders for narrow cold strip are moderately lower, but unrated inquiry tends heavier. Cutbacks and cancellations are minor factors affecting nearby deliveries thus far; considerably more firm tonnage must be winnowed from backlogs before steel is available for substantial early reconversion. Little tonnage can be worked into schedules before October. While some unrated volume may be processed for fourth quarter, unless backlogs are revised, practically none is indicated for third quarter shipment. New allotment system starting July 1 in effect puts converters on a replacement basis, two months back. This voids forward orders for hot stock placed well into next year by some cold finishers. Although fabricators show more interest in reconversion requirements, there is no great pressure for volume or delivery. Demand for No. 12 hot-rolled sheets for 275-gallon household tanks is active under MRO regulations and pressure for deliveries is strong. On the whole, however, new sheet buying is slower, notably under allotments which are in to the extent covered. Inquiry for free tonnage is growing, but uncertainty as to early supply of other materials and components needed for resumption on numerous fabricated products tends to retard pressure in some cases.

Cincinnati — The shift in military programs is bringing an increased volume of sheet cancellations, but little of this tonnage affects near deliveries. Furthermore, backlogs are still extended. The tight situation in sheets has not been relieved to the point where schedule positions can be given on demands of domestic goods fabricators whose specifications are being placed on file in ever greater tonnage. Cutbacks in aircraft have left schedule openings in

BIG STUFF



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August and September on stainless.

St. Louis — Sheet backlogs are reported larger than in January. Cutbacks and cancellations are being replaced by other essential tonnage. Labor shortage is still acute, aggravated by necessity for more workers in finishing sheets than were required for plates. Some tonnage will be open for warehouses in December. Deliveries on cold-rolled sheets fall in February and later, hot-rolled in January and tin mill products in October and later. Some postwar orders are being taken without mill encouragement, principally for stoves, boilers, road equipment and repairs. Demand for galvanized roofing and siding is heavy. Civilian deliveries are not expected until after Jan. 1.

Pittsburgh — Much interest is shown in the fate of validated sheet tonnage for production of automobiles and refrigerators on third and fourth quarter schedules. Current announcements from Washington are as usual several days ahead of actual orders affecting this tonnage. Statements that refrigerator production for civilian use will begin in time to permit delivery of finished products in September would seem to indicate early validation of sheet tonnage for this purpose. In fact, it would probably be necessary to schedule sheets for July production in order to meet this goal. Automobile production is not scheduled that early but it will be necessary to find a gap in third quarter schedules somewhere for automotive sheets. As yet there is no indication as to how this will be done since some tonnage already booked will have to be canceled or pushed back to later delivery to make room. In view of the fact that holders of validated orders specified for fourth quarter have already found no place to put this tonnage, it is difficult to see how all the required tonnage will be handled. Meanwhile, production continues hampered by lack of manpower on finishing mills, and the local office of the War Manpower Commission sees no change as far as the immediate future is concerned.

Chicago — Almost no cancellations are occurring in sheets and new tonnage is begging for place on schedules, with result that this commodity remains by far the tightest of all steel products. Despite open ending of CMP on June 30, consumers are reconciled to the fact they will be unable to obtain unrated sheets in third quarter. This applies particularly to cold-rolled sheets, which stand in December delivery. Strip mill sheets and hot-rolled are in March, and hot-rolled pickled and galvanized in February. Both narrow and wide strip are unavailable before March, hot-rolled in December and hot-rolled pickled in March.

Philadelphia — While backlogs in sheets have shrunk to some extent, principal pressure is in this product. Close to 250,000 tons required by the claimant agencies for third quarter cannot be placed at this time and various producers are more than a month behind on current shipments. Most producers of hot-rolled pickled and cold-rolled sheets are booked solidly into December and early next year on rated tonnage alone. War cancellations may alter this picture later. Galvanized sheet quotas have been restricted because of zinc shortage, it is said, causing various mills to extend their schedules. Capacity still is available for late this year but mainly in heavy gages. Because of easing in stainless steel, producers again will be permitted to ship to jobbers all the tonnage they have validations for. This easing is reflected in other directions also. Release of stainless for a limited amount of railroad passenger car construction is an example. One eastern car builder will consume about 4000 tons of stainless sheets for this purpose in last half, though much of the tonnage is said to have been covered by old orders.

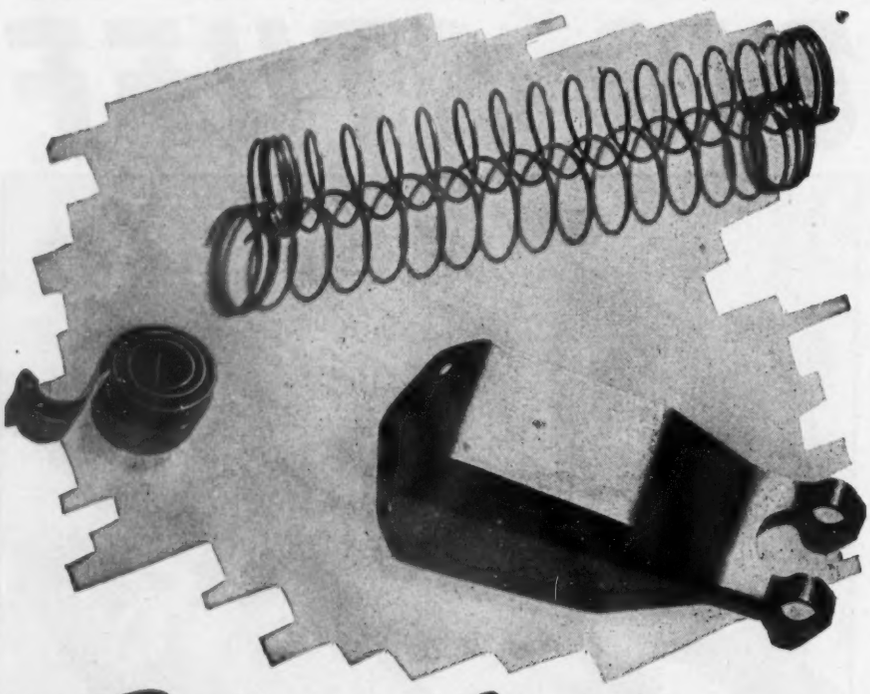
Steel Bars . . .

Bar Prices, Page 202

Larger diameter bars now are promised for late fourth quarter or later, but alloy bars and smaller hot-rolled material are available for third quarter. Indications are some unrated bar tonnag may be available in that period. Cutbacks in ammunition programs are beginning to reach mill level. Cold-drawn bars under two inches are available for fourth quarter, with larger diameters generally promised for first quarter.

New York — While alloy bars and smaller sizes of hot-rolled bars can be had in third quarter, shipments on larger diameter hot bars fall late in fourth quarter and beyond. Where hot-top quality is required shipments generally are being quoted for first quarter of next year.

Easing in alloys has developed to an extent where some producers look for



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a certain capacity to be available in third quarter for unrated tonnage. Some sellers now have both open-hearth and electric furnace alloys available for shipment in mid-summer and with further cutbacks expected in the aircraft program, no particular strengthening in the position of alloys is expected in the near future.

Cold-drawn bars are being quoted for fourth quarter and beyond, with sizes from two inches and larger being offered generally in the early part of next year. The rocket program is contributing particularly to the stronger position of these larger sizes.

Cleveland — Bar orders continue to press and while cancellations in shell rounds are being received by mills they have little effect on the delivery situation, most affecting bookings fairly far into the future. Deliveries are late in the year and into early months of next year. Little expectation is held of ability to make deliveries on much tonnage on unrated orders this year.

Boston — Continued improvement in schedules indicates limited volume of unrated hot-rolled alloy bars will be available for third quarter delivery in both electric furnace and open-hearth grades. There is less chance for cold-finished, turned or heat-treated stock. In hot-rolled, several mills have moved forward bar deliveries one month or more, nearly three in one case as regards open-hearth; this despite a continued strong demand for alloys in this area, although substantially from warehouse.

St. Louis — Cancellations, cutbacks and holdups have confused the situation in bars but new orders have offset reductions. Mills are accepting for shipment in August to October, but make no guarantees. Principal buyers are automobile, farm implement, toy and small vehicle manufacturers. A considerable number of small manufacturers with Z-3 ratings are placing orders. Cutbacks are mainly the result of imminent shell and bomb program completion. A third to half of bar production is expected to go to civilian use in fourth quarter. Capacity production is predicted for two years.

Chicago — Bars are being afforded some relief from comparatively small cutbacks in shell steel, in some cases effective at once and continuing over succeeding months. These cutbacks permit more steel to go into pressing bar tonnage, or to increase production of rails or other important products. Regular carbon bars now can be had in September, formerly were March. Quality bars, on the other hand, stand in February. With cutbacks in aircraft, alloy electric furnace bars have moved from November-December to July; open-hearth from December to August.

Philadelphia — Plain carbon bars are available for September in smaller sizes and alloy bars can be had in July in electric furnace grades and September in open-hearth. In plain carbon grades, 1¼ inches and larger, deliveries fall late in the year for most producers and into early next year. Hot-top quality bar schedules are even more extended, with one leading producer still quoting April on anything over 2⅝ inches.

Steel Plates ...

Plate Prices, Page 203

Plates are easiest of all major steel products and are expected to remain so, although some additional business of size is likely to develop soon. Demand is well below the level of earlier months, as shipbuilding tapers. Universal plates can be promised for midsummer and a sheared plate mill offers July, though most producers quote August. Some unrated tonnage is expected to be available this year but not much has been offered, due to uncertainty of CMP priorities.

New York—While plate demand is well below the level of a few months ago, there is still a fairly good volume of business. Ship reconversion and repair work is as heavy as at any time and railroad specifications are heavier than recently, reflecting in part foreign requirements. Jobber demands are holding up fairly well.

Some universal plate tonnage can be had in the next three to four weeks and one large producer of sheared plate can still book orders for July. However, most plate producers now quote August shipment. It is the general expectation that a reasonable amount of capacity will be available for unrated tonnage, but most sellers claim that they have not been offered much unrated work to date, due perhaps to the uncertainty that still exists because of CMP priority.

Chicago — Plates continue in easy position, compared with other steel products and with the declining shipbuilding load are expected to remain so. Considerable plate now is going into heavy bombs, and this load may increase. Sheared narrow plates are quoted for

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December delivery, formerly January. Sheared wide plates, formerly July, have moved to August, and universal plates have gone from September to August.

Boston — Material, in part including plates for four destroyers transferred to Bath, Me., from a New Jersey yard, will be rerouted from the latter, reducing purchases of steel. Meanwhile several yards, including Providence and Bethlehem-Hingham, are nearing completion of present contracts. Except for Navy yard needs, also on a lower scale, plate buying for shipbuilding has dwindled to fill-in lots with inventories culled for all steel possible. Although fabricators of heavier industrial equipment are maintaining miscellaneous orders; only a fraction of the tonnage lost in ship construction is forthcoming from other sources. Railroad passenger car needs are likely to increase before the end of the year. Slack is also evident in floor plate demand with jobbers now doing most new buying on six weeks delivery. Sheared plates are still promised for July by some mills, although others are extended into third quarter.

St. Louis — With the Maritime Commission program completed, plate production has dropped to approximately peacetime level, all output being earmarked for ship repair. Mills now expect plate production to continue at 12 to 15 per cent of capacity for some time. Almost 90 per cent of plate capacity has been shifted to sheets.

Philadelphia — Plate demand is light with delivery schedules irregular. One large producer now is in August, compared with July only a few days ago. At least two others, on the other hand, again have some tonnage for July after recently being closed for that month. Still another producer with close and important shipbuilding connections, is booked until September.

Wire . . .

Wire Prices, Page 203

New York — Reduction in communications wire requirements for the armed services, largest in field wire, has opened up some fine size capacity for both high and low carbon and slightly eased pressure on galvanizing equipment at some mills. Openings are not large and are soon filled. Cancellations in keystone wire makes available more steel with several producers. On the whole, however, while there have been other reductions in aircraft, nearby mill delivery schedules have not substantially improved. More unrated tonnage inquiry is appearing, mostly for nonessential products which have been prohibited, but numerous fabricators still partly engaged in war production have not yet lined up reconversion needs. Demand for metal screen material holds at a high rate and is likely to continue. Most mills are booked through the year on nails and no decline in demand is likely.

Boston — Minor openings in wire mill schedules thus far involve small tonnage for nearby delivery. Backlogs in fine wire specialties are subject to slight revisions; although some music and valve spring wire has been canceled, volume is not large. There are cutbacks in aircraft and more are expected. Volume of new rated orders is lower, but inquiry for unrated is heavier with some pressure for definite delivery promise.

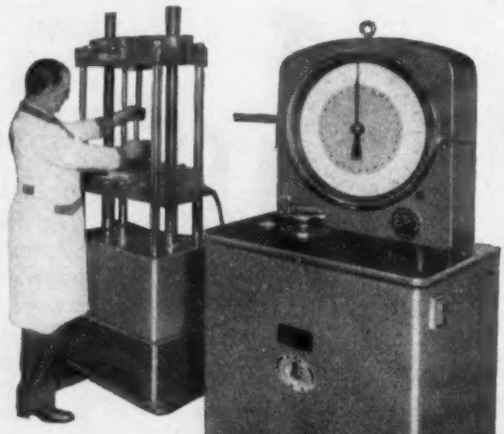
Chicago — WPB's recent order opening CMP after June 30 is expected to result in a heavy influx of unrated wire orders seeking delivery after mid-year. However, producers indicate that cancellations so far have been insufficient for them to supply unrated wire during July, at least. Stocks of electric cable and wire rope are limited.

Tin Plate . . .

Tin Plate Prices, Page 203

Chicago — The recent M-43 order of WPB limiting use of pig tin to 100 per cent of the amount consumed in the equivalent calendar quarter of 1944 may adversely affect the effort to increase tin plate production. WPB had been seeking expanded production and in spite of the limiting factor of manpower had succeeded in a mild way. Now this achievement may be nullified.

Pittsburgh — Third quarter operations may show an increase of 10 per cent over second quarter, according to sources here. This is not definite but is based on the fact that more steel has been allotted for tin mill products and it is almost certain that if packers find they are able to consume the plate in packing food crops, means will be provided to supply the necessary tin in view of the critical food situation. Position of tin stocks has not yet been clarified but it is obvious that the type of plate to be produced will be governed by availability of tin, which in its turn will govern to some extent the type of crop which can be packed. The 825,000-ton quota which has been followed for the past three quarters would under present plans rise to 900,000 tons



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for third quarter based on the fact that third quarter is normally the peak in packing operations.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 203

New York — Bolt and nut backlogs are shrinking somewhat, although most producers are booked ahead 8 to 10 weeks and are behind on current delivery promises. Were bolt and nut makers able to obtain sufficient labor to operate fully, their backlogs would be reduced considerably, for new demand is not holding up to levels of a couple of months or so ago.

Manufacturers engaged in Navy work and in Signal Corps requirements have not experienced any important cutbacks. On the other hand, those engaged in producing airplane bolts and certain merchant ship requirements have suffered rather sizable cancellations.

Specifications from United States Army engineers have dropped off rather sharply and while there are numerous export inquiries of a purely commercial nature little business is developing as licenses are being issued sparingly by Washington.

Bolt and nut makers will obtain about the same amount of steel in third quarter as granted for the current period. However, their allotments will be equivalent to about 80 per cent of the tonnage allowed for third quarter of last year.

Rails, Cars . . .

Track Material Prices, Page 203

New York — Both domestic and export railroad car work is mounting. In addition to 36,750 freight cars for France and 6000 for India the War Department is expected in the market for 12,795 miscellaneous freight cars for its own use. The list includes 5840 box cars, 3860 flat cars, 1290 high-side gondolas, 1200 low-side gondolas, 385 tank cars and 130 refrigerators. Meanwhile, opening of bids on the French cars by the War Department for the Foreign Economic Administration has been postponed from June 8 to June 22 and on the cars for India from June 11 to June 22. The Indian cars and 30,000 of the French cars, including 20,000 box and 10,000 gondolas, will be built in 1946, while the 6750 box cars are for delivery before the end of 1945, with 1500 forty-ton low-side gondolas for France, which have just been placed by the War Department for FEA, 800 going to Ralston Steel Car Co., Columbus, O., and 700 to American Car & Foundry Co., New York.

War Production Board has authorized construction of 407 passenger cars, orders for most of which have long been on builders' books. Pullman-Standard Car Mfg. Co. is permitted to go ahead with 197 cars, Edward G. Budd Mfg. Co., with 147, American Car & Foundry Co. with 51, St. Louis Car Co. 8 and the Pennsylvania railroad's Altoona, Pa., shops 4. Builders are authorized to use stainless steel where desired. Of the 197 cars to be built by Pullman 153 are for the New York Central, against an order placed almost a year ago. A substantial portion of the Budd program is also for the New York Central. The tank car authorizations include 20 seventy-ton cars for Pittsburgh Plate Glass Co., to General American Transportation Corp., Sharon, Pa.; 25 forty-ton cars for Shippers' Car Line Corp.; one 50-ton car for Monsanto Chemical Co. All these cars will be built at the Milton, Pa., plant of the American Car & Foundry Co.

Structural Shapes . . .

Structural Shape Prices, Page 203

Chicago — The past week has seen almost no awards of structural steel in this area and new inquiry is light. The fact that mills may be in a position to accept unrated orders for shapes in last half of the year has so far not created a quickened interest to get postwar building and expansion in motion. The belief is that little unrated material will be available until late in the year. Reports are that U. S. engineers are about to announce substantial cancellations in the large number of treadway units ordered recently. This would affect several midwest fabricators adversely and provide space for building construction. Mill situation for standard structurals has improved, material now being available in August, formerly September.

Boston — Placement of 840 tons for two bridges is outstanding, presaging an increase in tonnage in that direction. Construction inquiry is light and most fabricating shops need work. While maritime shipyards have long since terminated subcontracts, limited tonnage is out for Navy yards, involving both shapes and plates. Shapes are a trifle easier, mostly wide flange material, with

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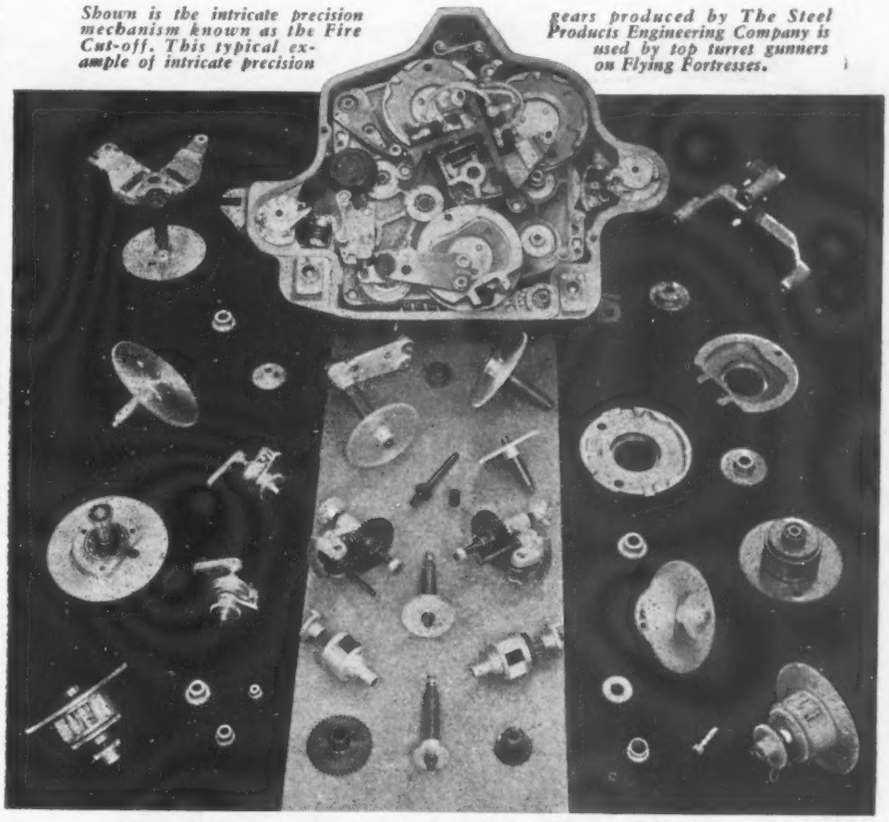

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some mills in August. Cutbacks in shell steel account for this easing in most instances.

Philadelphia — Structural shapes are available for August and September delivery with little recent change in schedules. Considerable pending business is before the trade and may increase mill orders in the near future.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 203

Chicago — No important awards of reinforcing steel have been made recently and inquiry has slackened to almost a standstill. However, there is considerable volume of work involving less than 100 tons per job. It is understood U. S. engineers are seeking 13,000 tons of bars, 70 per cent of which will be used west of the Mississippi river. The trade also hears of a lend-lease inquiry for 26,000 tons of large size plain square bars for reconstruction work in France.

Pittsburgh — Totaling some 30,000 tons, an order for large bars from France through FEA has been in the market and has been partially booked. This tonnage will be in structural grade, some plain and some deformed, and will be new billet steel, following earlier placement of some 15,000 tons of smaller size bars which went entirely to rail mills. At the same time there has been a moderate increase in inquiries on the domestic market. Prices reported on all current jobs are firm at full Office of Price Administration ceiling levels.

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Pig Iron . . .

Pig Iron Prices, Page 205

Melters continue to take all the pig iron produced, melt being limited only by labor supply, which suffers by competition of other trades paying higher wages. Pressure on producers is eased somewhat by better deliveries since transportation difficulties have been overcome. Third quarter orders are about the same as for first and second. Sellers show little interest in a flood of foreign inquiries, having no excess output for this purpose.

New York—District pig iron melt is lighter, due to increasing shortage of manpower. Foundrymen claim that munition cutbacks in the district have been light and that various manufacturers engaged in war work and shipbuilders are still in need of men and that they, in fact, continue to draw upon foundry labor by virtue of higher wages generally offered.

This slight easing in melt, combined with the fact that various foundrymen had earlier in the year specified more freely than usual because of threatened fuel shortages at blast furnaces and difficulties in transportation, has lifted the pressure on pig iron. However, there is no real surplus of iron. This is manifested in lack of interest being shown by most producers in foreign inquiries that are still virtually flooding the market. Another reason, though, is difficulty in obtaining shipping space.

Cincinnati—Foundries are placing orders for third quarter pig iron steadily, chiefly with established sources of supply, and for tonnages close to those specified in earlier months this year. Shipments of pig iron are becoming more prompt, whereas formerly lags had threatened shutdowns because of light stocks carried. Cutbacks in castings have been few. Machine tool requirements and demands from makers of domestic goods are holding the melt at the peak possible with available labor.

Pittsburgh — Supply of pig iron is probably at its most critical point since the beginning of the war. Pressure is heavy on steelmaking iron, as well as on foundry grades, and some emergency arrangements have been made to supply iron at points facing a critical shortage. Production has been resumed at the Struthers Iron & Steel Co. stack at Youngstown, O., and the entire output is going to a steel producer. No. 6 furnace at Edgar Thomson works, Carnegie-Illinois Steel Corp., was blown in June 1 and No. 4 furnace at the same works was banked June 4. The difficulty in this case, as well as in several others, is the manpower situation. Struthers furnace is operating on a short crew although efforts have been made over a period of several weeks to recruit sufficient workers. The same is true at most other plants in this district.

Boston — Third quarter covering by pig iron consumers has started with indications more will buy for the full period. Around 25 per cent continue to order on a monthly basis and until inventory restrictions are revoked not much change in this ratio is expected. Melt is maintained in the aggregate, although there are lagging spots, notably at one shop usually specializing in railroad equipment castings. Losses developing from cutbacks, mostly minor, are made up by heavier requirements for normal products, although limited

labor holds down some melts. On the whole the supply of iron is ample; all basic is coming from outside and one steel works recently held up shipments for three weeks. Cast pipe foundry will supplement recent shipments from the district furnace with outside iron. Everett furnace, with reserves low, is delivering little beyond trucking distances.

Buffalo — In spite of reduced tonnage of naval and airplane castings there is no shrinkage in pig iron bookings for third quarter compared with second. Present foundry operations continue mainly for war uses with a large portion of top priority railroad castings included. Even with further foundry cutbacks the opinion prevails they will seek to be covered for an immediate swing into civilian production. Most foundries still need labor and could increase output materially with more workers.

St. Louis — Pig iron continues under pressure of the past several months and no effect of changed war conditions is evident. Production is unchanged but labor shortage threatens a reduction soon. Layoffs in other sections of industry have given no relief to mills and furnaces.

Chicago — Pig iron is under slightly less pressure in this district, due partly to some cancellations of war castings and partly to a growing uncertainty of the future. Cancellations have to do mainly with steel castings for tanks and tractors. While foundries have plenty of rated orders to fill gaps in schedules, some time is required to effect production line changeovers. Another blast furnace here has gone down for relining and this in time may be reflected in supply of merchant iron. This is South Chicago No. 5 stack of Carnegie-Illinois Steel Corp. which blew out May 31. Currently 37 of the district's 41 furnaces are operating. Of the four idle, three are Carnegie-Illinois units and one Inland Steel Co., all out for repairs or relining.

Philadelphia — Third quarter contracting for pig iron is becoming increasingly general although some consumers are buying on a month-to-month basis. Recently a large furnace at Bethlehem, Pa., was forced to close down for repairs and is expected to be out of blast for about a month. In general, supply and demand for both foundry and basic iron appear in reasonably good balance.

Scrap . . .

Scrap Prices, Page 206

While some factors in the scrap market make for continued strength others point to price weakness possibly spreading from the East. In general ceiling prices are being paid on steelmaking grades and cast scrap, with borings and turnings still at lower levels.

Pittsburgh — Although current market situation is still in the rumor stage, there is possibility of a break in prices here, following withdrawal from the market of the principal buyer. This follows similar action in eastern markets by Bethlehem Steel Co. which caused shipment of considerable tonnage of scrap to the Pittsburgh district which normally would be consumed in the East. Heavier supplies of scrap here have created withdrawal of United States Steel Corp. subsidiaries from the market in a move which is characterized as merely temporary. Any continued absence from the market of this consumer would unquestionably cause a drop in scrap prices here, particularly with heavy tonnage available from eastern scrap sources. At present, however, no prices have been shaded on recent transactions beyond the fact that it is reliably reported no maximum springboard is now being paid and in some cases scrap has been bought less commission.

Buffalo — Though no sales of importance have been made scrap dealers appear to succeed in resisting bids below ceiling for quality material. While one large consumer continues to offer lower prices, another announces intention to buy soon at ceilings. With ingot output at capacity and scrap not plentiful in local yards factors are for strength. Receipts from other areas are negligible, because of labor and transportation difficulties. Turnings continue below ceilings. A shipment of 3000 tons from the eastern seaboard has arrived by canal. A consignment of scrap by lake allocated here was diverted en route, presumably to Chicago.

Boston — Dwindling supply of shipyard scrap contributes to limiting tonnage of good steelmaking grades, notably in the Providence district, where the maritime yard will close this summer. Wanted grades of heavy melting steel continue tight; steel works are maintaining inventories below normal, but are not adding much to reserves. Lighter grades of industrial scrap are plentiful and prices are subject to pressure. Full water-front differentials are not met by district consumers, but partially so on

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recent shipments to Pittsburgh or $14.73 f.o.b., heavy melting steel, and $17.23, low phos. Open sales of mixed turnings, also alloys, to dealers have been made at lower prices and unprepared heavy melting at $9.31. Cast grades continue scarce and most bundle shipments are to points outside this area.

Detroit — Mixed sentiments prevail, with some weakness developing in low-phosphorus plate, while short turnings are stronger, not sufficiently, however, to call for any changes in published quotations. Effect of arms cutbacks already is being reflected in scrap lists, latest Fisher Body Co. list being only half the tonnage of the previous month. Some observers expect a steady decline in scrap supplies over the next six months, since output of automotive scrap will be limited until production can be pushed up to former levels. Considerable volume of scrap in the form of tools, dies, jigs and fixtures used in war programs is appearing, practically all of it welded rolled steel against a proportion of about 80 per cent cast in this material a few years ago.

Cincinnati — The iron and steel scrap market appears duller, although a good volume is moving. Mills in the main have adequate inventories, and there is no imminent pinch which might induce them to buy for supplementing stocks.

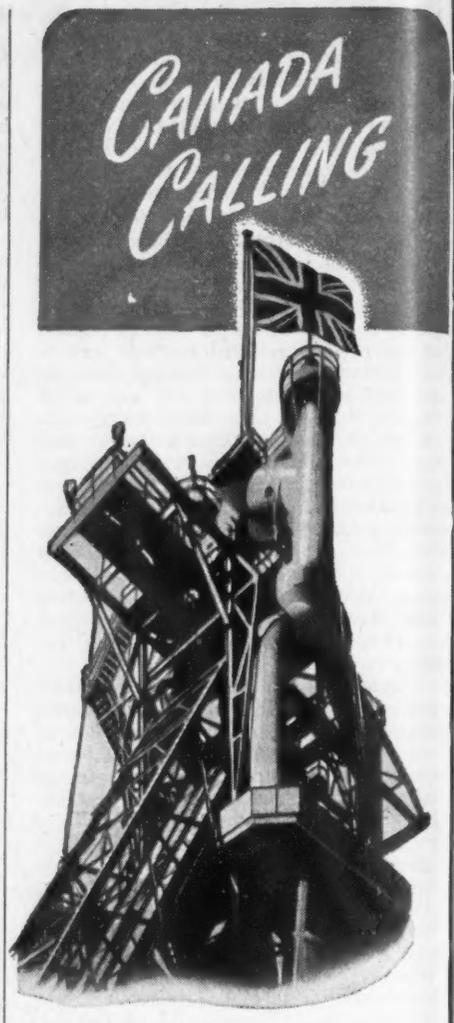
St. Louis — Scrap supply is easier with mills reporting six weeks or more supply. Except for machine turnings and borings, prices are at ceilings, although supply indicates they soon may be under pressure. Buyers have withdrawn from remote areas. Quality is better than a year ago. Percentage of home scrap is on the increase.

Los Angeles — Tightening supply of steel and iron scrap is slowly forcing prices toward OPA ceilings. Cast scrap supply is tightening, with many sales at ceilings. Dealers and consumers are buying freely, the latter concentrating on No. 1 shipyard material, which is dwindling. Small lots of military scrap, mainly ordnance, which have been arriving here are being sent direct to the East. Southern California scrap continues in better supply than in areas to the north as shipbuilding cutbacks are less evident.

Chicago — Scrap demand remains good, although consumers continue to keep buying balanced with consumption. All grades of heavy melting material are in demand and move freely as offered. Baled machine shop turnings and loose machine shop turnings hold their recent strength, although sales bring prices in a range much wider than customary. While steel mill operations are declining slightly, condition of equipment rather than lack of orders is responsible. Barring a sudden end to the Japanese war, a high rate seems certain for the next two or three months.

Cleveland — Prices of steel and iron scrap shows no weakness and some factors are tending to strengthen quotations on turnings and borings. Supply of these grades has been cut down by reductions in the shell program, while demand has held at former levels. With an important consumer out of the market for the past two weeks no distress tonnage has appeared and ceilings prevail on all steelmaking grades.

Philadelphia — While buying is spotty the scrap market uidertone is firmer. Heavy melting steel holds at $18.25, delivered, and there is more dis-



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position among consumers to buy ahead on this basis. Borings and turnings are firm and the entire price list is unchanged.

Warehouse . . .

Warehouse Prices, Page 204

Boston — Current order M-21-b-3, under which steel warehouses obtain stock replacements, will be revoked July 15. The 15 days' overlapping period of two orders is established to allow warehouses to order replacements of tonnage sold from stock through June 30, under the present plan, up to July 15. The new direction establishes seven groups of steel products under which warehouses must collect CMP allotments for purpose of ordering stock replacements, if they wish to order on an authorized controlled materials order basis. The first group embraces all types of stainless steel, while the other six groups cover the entire range of alloy and carbon steel products in controlled material form. The purpose of establishing the seven groups of steel products specified in Direction 3 is to prevent a warehouse from using allotments obtained from the delivery of a product purchased on unrated orders to order a product in another group obtainable only on authorized controlled material orders. Steel products sold on a Z-3 symbol may be replaced by a warehouse on the same basis as steel delivered on other CMP symbols. Steel products sold on an unrated order may be replaced from steel mills only on an unrated basis.

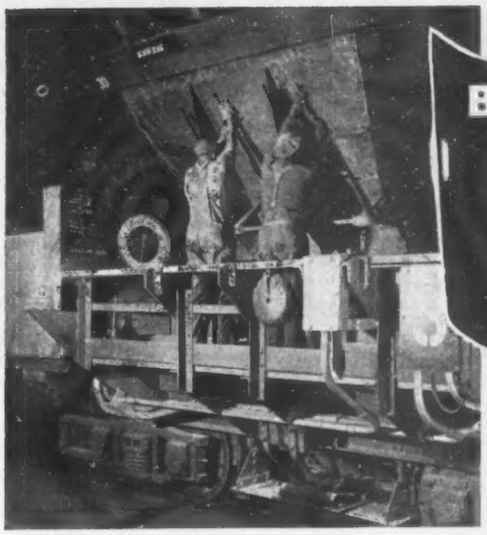
New York — Volume shipped by steel warehouses has declined only slightly from high levels. Replacements continue a major problem with improvement slight except in the case of plates and some heavier gages of sheets. Demand for alloys from distributors is holding strong, also pipe and wire products, including nails. Most jobbers have unbalanced wire product inventories. Cancellations have had no material effect on warehouse operations. Reconversion of Liberty ships to troop carriers is bringing out spot demand for plates, bars and miscellaneous products.

Los Angeles — Continued shortages exist in all grades of sheets, alloy steels, bars and shapes in warehouses. Jobbers are confused by complexities of OPA pricing on merchant items. Sales volume is leveling off, with reconversion activities not sufficiently developed to be a factor in new business. Compared with 1941 peacetime movement present sales still are high.

Cleveland — Warehousemen locally find individual steel orders are smaller, attributed by some to effect of reconversion planning. However, it appears that cancellations of war material have been less in the Cleveland area than in other important districts and war products manufacturers have suffered less disruption of plans. Warehouse stocks are fairly good, total tonnage being excellent, with some broken assortments limiting sales. Labor shortage delays deliveries on materials requiring special handling.

Canada . . . .

Toronto, Ont. — While much uncertainty prevails as to the future of Canada's war production program, there are no indications of curtailment in demand for iron and steel. New business con-



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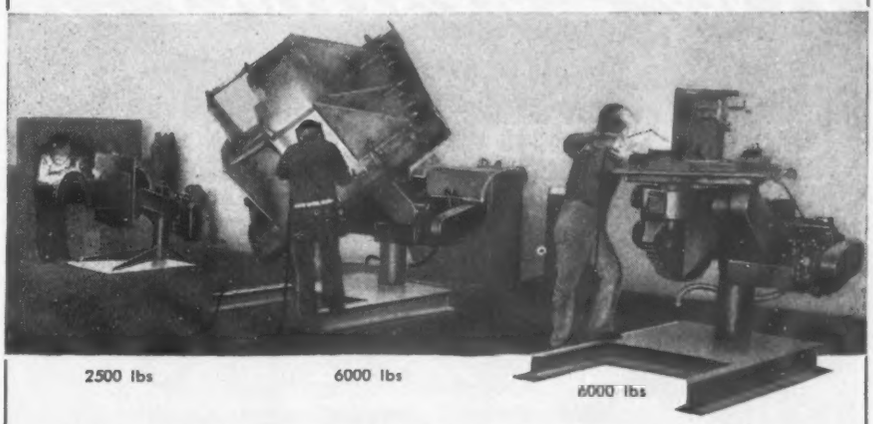

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tinues heavy both for finished and semi-finished steel and mill backlogs now extend well into 1946. Some war business has been canceled or sharply reduced but despite this fact there has been no easing in general supply and producers continue to quote long term delivery dates. According to announcements in government circles no delay will be made in the swing from war to peacetime production and within the next month or six weeks definite results will be noted in increased output of consumer goods. Steel buying on this account is becoming more pronounced, and inquiries also are in greater number.

Demand for steel plate is showing some improvement, but there is no shortage and producers are giving delivery within three to four months.

There has been no easing in sheets with the result that a large part of business now appearing is for delivery in first quarter next year, with most producers reporting no surplus capacity through 1945. Large orders are expected to appear soon in connection with the new automotive production program, while other civilian consumers also show keen interest in the market.

Bars, both carbon and alloy, are in tight supply with mills almost solidly booked through fourth quarter. Demand is heavy on all sizes, with indications from recent placements that there is now a definite swing from war to peace production activities. Mills, however, continue to carry large tonnage war orders on books and are maintaining schedule delivery against this business.

Production of steel and pig iron for April showed a slight decline from March, while ferroalloys rose to a new peak for the year. The loss in steel production was due to the shorter month as the daily average was at an all-time high record. Throughout April nine blast furnaces were blowing with five down. Comparative production figures are as follows, in net tons:

	Steel Ingots Castings	Pig Iron	Ferro-alloys
April 1945	274,213	156,070	18,350
March 1945	277,461	165,817	16,434
April 1944	170,364	260,835	12,818
4 Mos. 1945	1,070,860	627,343	60,316
4 Mos. 1944	1,008,402	612,417	57,460
4 Mos. 1943	987,915	565,154	69,493

Metallurgical Coke . . .

Coke Prices, Page 203

Chicago — Interlake Iron Corp. is taking out two batteries of coke ovens in bad repair. This is not expected to affect supply of metallurgical coke, rather it will mean that less domestic coke will be available. The company's two Federal blast furnaces will continue to operate. To offset the loss of gas suffered by the ovens going down, Peoples Gas Light & Coke Co. has started to take gas from the ovens at Republic Steel Corp.'s DPC plant in South Chicago.

Steel in Europe . . .

London — (*By Radio*) — Fuel scarcity in Great Britain is putting a limit on pig iron output. Finished steel demand is irregular. Heavy structurals are in slow demand but sheet requirements are active. Railroads are operating to capacity to meet heavy transportation needs.

Iron Ore . . .

Iron Ore Prices, Page 204

Loading of Lake Superior iron ore in May totaled 11,121,203 gross tons, compared with 7,282,074 tons in April. May movement was 993,008 tons, 8.2 per cent less than in May last year, as reported by the Lake Superior Iron Ore Association, Cleveland.

To June 1, 1945, total loadings were 18,403,277 gross tons, compared with 17,291,014 tons in the comparable period in 1944, an increase of 1,000,987 tons or 5.75 per cent. Included in the 1945 shipments were 42,408 tons of Steep Rock Canadian ore from docks at Superior, Wis. When dock facilities are completed this ore will be loaded at Port Arthur, Ont. Canadian ore from the Michipicoten range in Canada amounted to 58,623 tons in May, compared with 77,597 tons in May, 1944. To June 1 this year shipments of this ore totaled 105,555 tons, compared with 111,276 tons in the same period last year.

Loadings by ports in May were as follows, in gross tons:

	May, 1945	May, 1944
Escanaba	697,358	871,943
Marquette	472,590	457,227
Ashland	684,863	964,144
Superior	*3,677,497	3,811,400
Duluth	2,942,338	3,057,396
Two Harbors	2,587,934	2,874,504
Total, U. S. Ports	11,062,580	12,036,614
Michipicoten	58,623	77,597
Grand total	11,121,203	12,114,211

*Includes 42,408 tons Canadian ore.

Cumulative shipments this season by ports are as follows:

	To June 1, 1945	To June 1, 1944
Escanaba	1,257,401	1,396,696
Marquette	889,701	672,226
Ashland	1,192,197	1,274,537
Superior	*5,731,150	5,478,280
Duluth	4,737,917	4,238,872
Two Harbors	4,489,356	4,230,403
Total, U. S. Ports	18,297,722	17,291,014
Michipicoten	105,555	111,276
Grand total	18,403,277	17,402,290

*Includes 42,408 tons Canadian ore.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1040 tons, buildings 26 and 27, Naval Supply Depot, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

340 tons, deck plate girder bridge, Conway, N. H., to American Bridge Co., Pittsburgh; Engineering Service Corp., Boston, general contractor.

100 tons, erecting shop, Sedalia, Mo.; for Missouri Pacific railroad, to Austin Co., Cleveland; an additional 210 tons abandoned.

100 tons, storage sheds for Wayne Iron Works, Wayne, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

3500 tons, municipal hospital addition, Hartford, Conn.; bids June 30.

2200 tons, Navy warehouses, Scotia, N. Y.; W. L. Crow Construction Co., 101 Park avenue, New York, general contractor.

1500 tons, experimental flight test building, Seattle, Wash., for U. S. Engineers.

1000 tons, store, factory building and boiler

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house, Nineteen Hundred Corp., St. Joseph, Mich.; bids June 9.

1000 tons, dairy products plant for Dairymen's League; Cauldwell-Wingate Co., 101 Park avenue, New York, general contractor.

500 tons, state bridge at West Springfield, Mass.

400 tons, buildings for Canada Dry Ginger Ale Inc., 100 East Forty-second street, New York, at Silver Springs, Md.

250 tons, coal breaker, Minersville, Pa.

200 tons, warehouse, Hinde & Dauch Paper Co., Chicago.

200 tons, warehouse building for George H. Pilling Co., Philadelphia; J. R. Farrell, Philadelphia, general contractor.

140 tons, Defense Plant Corp. building at plant of Superior Tube Co., Evansburg, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3500 tons, housing project, Stuyvesant Town Corp., Metropolitan Insurance Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, buildings 21 and 21A, Chrysler Corp., Detroit, to Truscon Steel Co., Youngstown, O., through O. W. Burke Co.

150 tons, Navy warehouse project, Bayonne, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through John A. Johnson Construction Corp., contractor.

100 tons, engine test cells, U. S. Navy, N. Kingston, R. I., to Bethlehem Steel Co., Bethlehem, Pa., through William Crowe Construction Co.

REINFORCING BARS PENDING

812 tons, war housing project, Forty-seventh street, Chicago; bids June 6.

400 tons, Army air base, Camp Springs, Md., Harwood-Nebel Co., contractor.

300 tons, superstructure, U. S. Rubber Co., Detroit.

PIPE . . .

STEEL PIPE PENDING

1500 tons, 36 to 60-inch steel pipe for Philadelphia Water Department.

RAILS, CARS . . .

RAILROAD CARS PLACED

Corporacion Peruana del Santa, Peru, S.A., 25 aluminum-steel hopper cars, 40-ton capacity, to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., division of H. K. Porter Co., Fittsburgh.

Defense Plant Corp., 1200 troop sleepers, to Pullman-Standard Car Mfg. Co., Chicago.

Defense Plant Corp., 400 kitchen cars, to American Car & Foundry Co., New York.

Spokane, Portland & Seattle, 500 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago, for Michigan City, Ind., shops.

Union Pacific, 500 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago, for Michigan City, Ind., shops.

LOCOMOTIVES PLACED

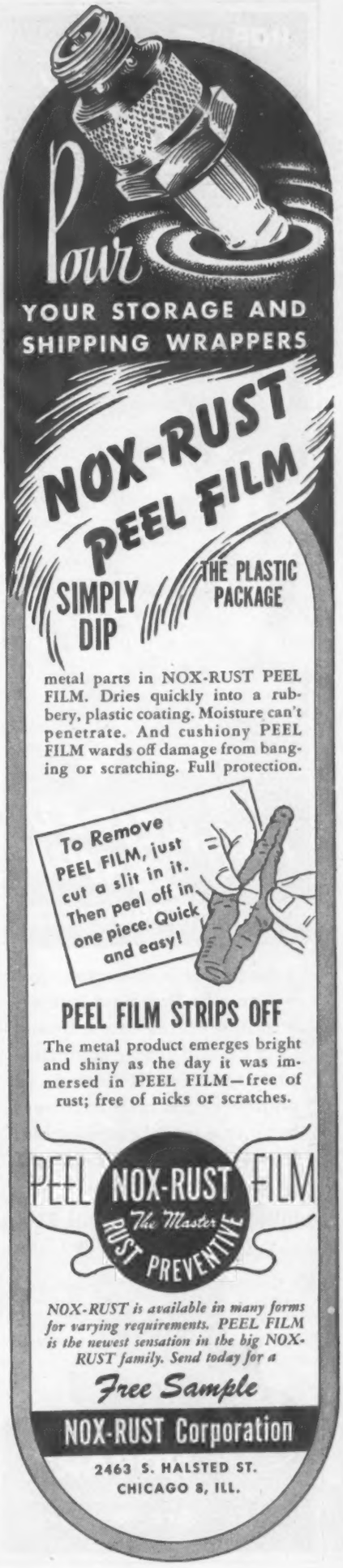
Corporacion Peruana del Santa, Peru, S.A., four 65-ton diesel-electric locomotives, to H. K. Porter Co., Pittsburgh.

Steel Men View Price Relief as Inadequate

(*Continued from Page 97*)

account the sales margin of this small mill over its semifinished cost is just about wiped out.

OPA's position that if hot-rolled sheet prices were advanced to an amount commensurate to that necessary under present conditions, that prices on hot-rolled sheets in some instances would be in ex-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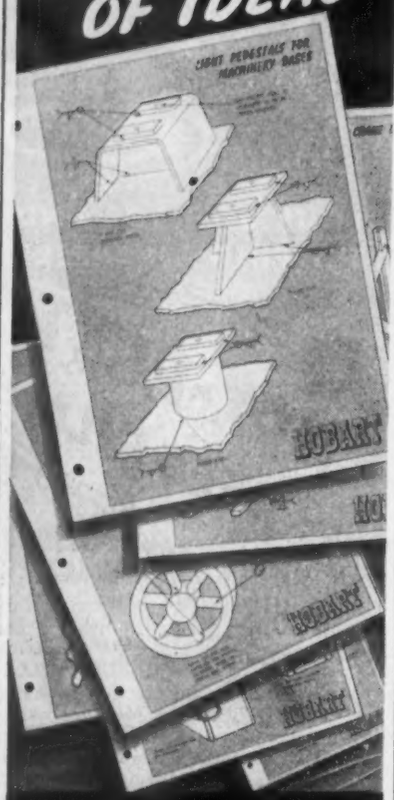

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cess of the price of cold-rolled sheets is disputed by this producer. He points out that profits of the mills producing the principal tonnage of cold-rolled sheets have been realized on other items of production, that the margin on cold-rolled is not excessive. He further declares it is unfair to penalize the makers of hot-rolled sheets by an argument of this kind, especially when the basis for calculation is the overall profit of the company which produces a competitive item as well as a number of specialties.

This producer states the nonintegrated companies receive directives from the War Production Board definitely outlining their tonnage of hot-rolled products. In one case a company is instructed to produce approximately 8500 tons of hot-rolled sheets and 1500 tons of galvanized sheets monthly. The OPA interim advance of $2 per ton on hot-rolled sheets granted in January and the $3 per ton advance granted at that time on galvanized sheets now are more than cancelled for the nonintegrated mills by the $2 per gross ton increase allowed on semifinished steel in May.

In the case of the cold-drawn bar producers a quite similar situation to that of the nonintegrated sheetmakers prevails. In the price advances allowed by OPA, hot-rolled bars, the raw material for the cold drawers, were upped $2 per ton while no increase was allowed on finished cold-drawn bars. Allowing for scrap loss of roughly 5 per cent, the cold drawers today are compelled to absorb an additional $2.10 per ton of finished product over their absorption previous to the upward price adjustment in hot-rolled bars.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Watco Engineering Inc., 2200 Scranton road, will increase plant capacity 50 per cent to enlarge production of heavy army trucks. New unit will be 10,000 square feet. W. L. Benjamin is secretary.

CLEVELAND—Forge Products Inc. has been formed to manufacture drop forgings, castings, dies and tools, by Vincent H. Jenkins and associates. Richard R. Hollington, 1535 Guardian building, is agent. Capital is $500 and 1000 shares no par value. Plant will be in former Cleveland Builders' Supply buildings in East Seventy-eighth.

NEWARK, O.—Pharis Tire & Rubber Co., 265 West Main street, plans a truck tire plant addition costing about $250,000.

STRUTHERS, O.—Supreme Metals Inc. has been incorporated with $25,000 capital by John R. Pompeii and associates. Theodore T. Macejko, 703 City Bank building, Youngstown, O., is agent.

TOLEDO, O.—G. White, City Hall, city engineer, has plans for postwar sewage treatment works in Bay View Park district to cost about $1 million. Jones & Henry, Second National Bank building, are consulting engineers.

TROY, O.—Hobart Mfg. Co., Pennsylvania avenue, plans a three-story factory building costing about $240,000.

WARREN, O.—American Welding & Mfg. Co. has WPB authorization for relocation of present equipment and installation of electric hoists, overhead traveling crane and other equipment for production of turret ball assemblies, to cost $24,000.

CONNECTICUT

DERBY, CONN.—Sponge Rubber Products Co., Howe avenue, Shelton, Conn., has let contract to Dwight Building Co., 152 Temple street, New Haven, Conn., for a two-story 100 x 315-foot addition, estimated to cost $300,000.

PENNSYLVANIA

CORRY, PA.—Raymond Mfg. Co. division of Associated Springs Corp., Corry, plans postwar addition to its plant, at cost of about $300,000.

HARMARVILLE, PA.—Gulf Research & Development Co., Gulf building, plans 35 x 53-foot furnace oil test laboratory, estimated to cost $60,000.

JEANNETTE, PA.—Elliott Co. has WPB authorization for a steel and brick plant 60 x 140 feet, and installation of steam turbine, boring mill and other equipment, to cost $533,215.

OIL CITY, PA.—Quaker State Oil Refining Corp., Oil City, will build an addition to its boiler plant and install a 90,000-pound per hour bent tube, powdered coal fired boiler with air preheater and auxiliaries. WPB priorities have been granted.

PHILADELPHIA—J. G. Brill Co., Sixty-second street and Woodland avenue, has let contract to C. H. Schwertner, 1220 Hamilton street, for a plant addition costing about $40,000.

NEW YORK

TONAWANDA, N. Y.—Buffalo Electro-Chemical Co. will undertake an expansion program to increase production 60 per cent, at cost of about $1,300,000. Siegfried Construction Co., 6 North Pearl street, Buffalo, is general contractor for the $400,000 building, the remainder being spent for machinery and equipment.

MICHIGAN

DETROIT—May Machine Products Inc., 4546 Elmhurst avenue, has been incorporated with $20,000 capital to deal in tools, machinery and appliances, by William J. Brownell, 9439 Prairie street.

DEXTER, MICH.—Scientific Specialty Co. Inc., 7300 Huron River Drive, has been incorporated with $40,000 capital to do general manufacturing, by John R. Scanlan, above address.

GRAND RAPIDS, MICH.—J. C. Miller Co., 55 Mt. Vernon street, is planning postwar construction of one-story 33 x 260-foot plant estimated to cost $50,000.

GRAND RAPIDS, MICH.—Dodge Tool & Mfg. Co., 59 Grove street NE, has been incorporated with $50,000 capital to manufacture tools and machinery, by C. Harold Dodge, 1844 Madison avenue SE, Grand Rapids.

TECUMSEH, MICH.—Ottawa Machine Products Co., 112 East Chicago boulevard, has been incorporated with $50,000 capital to manufacture castings, implements, tools and machinery, by S. N. Kring, 516 West Pottawatamie street.

ILLINOIS

SPRINGFIELD, ILL.—Central Illinois Public Service Co. plans new power plant at Meredosia, Ill., including 50,000-kw. turbine and auxiliaries. Also plans 138,000-volt transmission line to connect new plant with plant

at Hutsonville, Ill. Cost is estimated at over $10 million.

WOODSTOCK, ILL.—Alemite Co., 538 Erie street, Toledo, O., plans a two-story plant addition to cost $125,000.

INDIANA

ANDERSON, IND.—Guide Lamp Corp. division of General Motors Corp., Twenty-fifth and Arrow streets, plans postwar plant building 300 x 800 feet, to cost about $500,000, with equipment.

FT. WAYNE, IND.—Kunkle Brass & Aluminum Foundry Co., L. A. Fox, president, 121 South Clinton street, has plans for 200 x 500-foot and 30 x 140-foot foundry buildings on 8½-acre site west of Winter street.

FRANKLIN, IND.—Noblett-Sparks Co. Inc., Columbus, Ind., plans a one-story plant addition costing about $100,000.

INDIANAPOLIS—Bella Inc., 1709 South Madison avenue, has been incorporated with 1000 shares $50 value to deal in steel building products, by C. Byron Hewlett and associates.

MUNCIE, IND.—Moore Tool & Engineering Corp. has been incorporated with 1000 shares no par value stock to manufacture tools, dies and similar equipment, by J. L. Moore and associates.

SOUTH BEND, IND.—Studebaker Corp. plans a two-story 100 x 700-foot plant addition costing about $1,150,000.

DELAWARE

WILMINGTON, DEL.—Electric Hose & Rubber Co., Twelfth and Dure streets, has let contract to John E. Healy & Sons Inc., 707 Tatnall street, for a two-story 150 x 300-foot plant addition to cost about $100,000. Robinson, Stanhope & Manning Inc., Equitable Trust building, are architects.

MARYLAND

BALTIMORE—Harry C. Weiskittel Co. Inc., 4901 Pulaski Highway, manufacturer of soil pipe and fittings, gas ranges, etc., will build a one-story pipe storage building.

BALTIMORE—E. H. Hubbert & Son Inc., 1311 Ponca street, manufacturer of stainless steel equipment for restaurants, has let contract for a 3500-square-foot warehouse addition.

MISSOURI

ST. LOUIS—Gruendler Crusher & Pulverizer Co., 2900 North Market street, manufacturer of rock crushers, has let contract for a one-story machine shop addition 70 x 103 feet.

ST. LOUIS—Hussman-Ligonier Co., 2401 North Leffingwell avenue, manufacturer of refrigerating machinery, plans one-story plant at Glasgow and Benton streets, to cost about $500,000. (Noted May 21.)

ST. LOUIS—Hercules Die Co., 4722 Newcomb place, has let contract to H. B. Deal & Co., 1218 Olive street, for alterations and improvements to a one-story 135 x 185-foot plant building, including installation of heating furnaces, at 3405 Morganford Road.

ST. LOUIS—General Engineering & Mfg. Co., 1523 South Tenth street, has plans by W. C. Wallace, architect, for a one-story plant 240 x 280 feet and two-story office building 70 x 100 feet in 3400 block Maury avenue, at cost of more than $400,000, with equipment.

ST. LOUIS—National Bearing Metals Corp., 4930 Manchester avenue, has let contract for a one-story 83 x 95-foot addition to foundry and machine shop, to Smith-Cooke Construction Co., 4829 Easton avenue.

ST. LOUIS—Stout Sign Co., manufacturer of metal signs, will take bids about June 15 for a one-story 60 x 100-foot office building and one-story 150 x 300-foot plant in 6400

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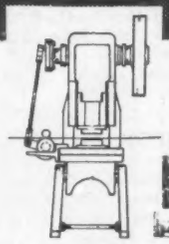

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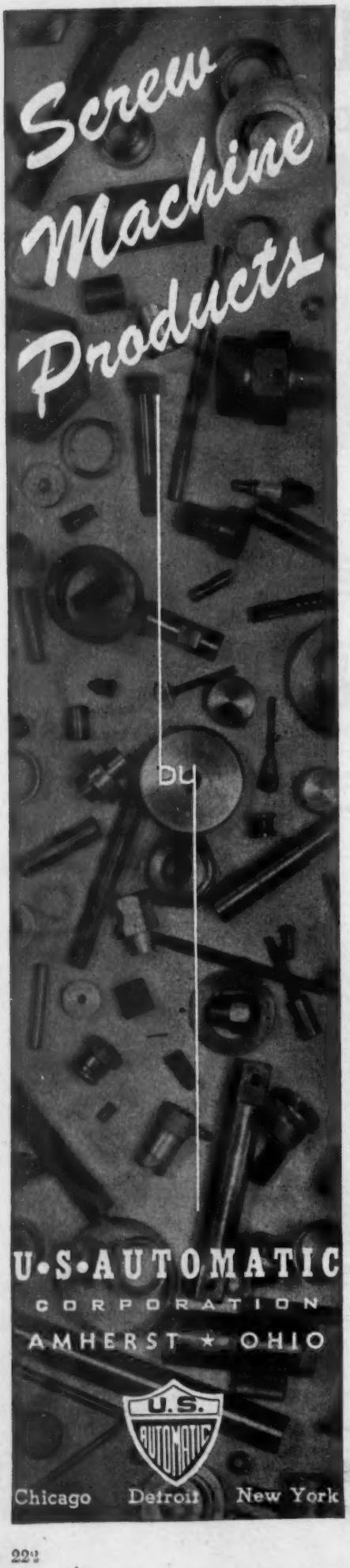

block of Florissant avenue. Hugo K. Graf, 2825 Olive street is architect.

WISCONSIN

BELOIT, WIS.—Wisconsin Power & Light Co., 122 West Washington street, Madison, Wis., has let contract to Cunningham Bros., 359 East Grand avenue, for a one-story 76 x 118-foot generating plant addition, estimated to cost $3 million, including equipment.

KENOSHA, WIS.—Nash-Kelvinator Corp., 5626 Twenty-fifth avenue, has let contract to Permanent Construction Co., 4100 West Third street, Milwaukee, for a one-story 200 x 250-foot plant addition, to cost about $165,000. Giffels & Vallet Inc., 100 Marquette building, Detroit, are architects.

RACINE, WIS.—Belle City Malleable Iron Co., 1442 Forest street, has let contract to Nelson & Co. Inc., 1550 Yant street, for an 88 x 120-foot pattern storage building. E. A. Klinger, 612 Fourteenth street, is architect.

MINNESOTA

MINNEAPOLIS—J. R. Clark Co., 725 Second avenue North, manufacturer of metal containers, has bought site for new plant to cost about $400,000. First unit will be metal-working plant costing $150,000, with later addition to house woodworking department costing $250,000. Magney, Tusler & Setter, Foshay Tower, are architects.

MINNEAPOLIS—Electric Machinery Mfg. Co., 1331 NE Tyler, manufacturer of electric motors, generators, controls, etc., has let contract to Kraus-Anderson Inc., 511 South Seventh street, for a one-story plant addition for the control division.

MINNEAPOLIS—Jacobson Machine Works, 1090 Tenth avenue SE, manufacturer of stokers, flour and feed mill machinery, has let contract to W. A. South Co., 126 South Tenth street, for a one-story machine shop addition.

OWATONNA, MINN.—Muckle Inc. has been incorporated to manufacture metal products, by S. A. Muckle and associates.

ST. PAUL—ATR Mfg. Co., 300 East Fourth street, has been incorporated to manufacture electrical and radio equipment, by N. L. Goffstein and associates.

WASECA, MINN.—E. F. Johnson Co., manufacturer of radio transmitting equipment, has bought site for large plant addition.

IOWA

CEDAR RAPIDS, IOWA—Rapid Aluminum Foundry Inc. has been incorporated with $25,000 capital to establish a foundry, by I. L. Tucker, president and R. L. Buckingham, secretary-treasurer.

ELDORA, IOWA—Lauren Maltby has let contract for a one-story machine shop 40 x 70 feet.

PLAINFIELD, IOWA—Schield Bantam Co. has been incorporated to manufacture a small dragline with trench hoe attachment. Vern Schield is president and Wilbur Schield vice president and general manager.

IDAHO

MOUNTAIN HOME, IDAHO—O. E. Morrell, city clerk, will receive bids June 12 for proposed $30,000 municipal disposal plant. L. W. Bouten, Boise, Idaho, is engineer. (Noted May 14.)

CALIFORNIA

LOS ANGELES—National Products Co., formed by Henry Mezori and associates, has established its machine shop and factory at 1213 South Brannick avenue.

LOS ANGELES—Machine Enterprise Co. has been organized by John W. Chapman and Herman C. Kuhlman and has established its plant at 3803 South Main street.

LONG BEACH, CALIF.—Beach Mfg. Co., formed by John Czinger Jr. and associates, has established its machine shop plant at 1390 Gladys avenue.

LOS ANGELES—Norman Tool & Die Co. has been formed by Harry H. and W. F. Norman and has established its plant at 4538 Orchid Drive.

LOS ANGELES—S. & E. Mfg. Co., organized by Everett Schneider and Carl V. Ellis, has started machine shop and manufacturing operations at 1515 South Evergreen avenue.

LOS ANGELES—Smith Mailer Co. has been formed by Clarence I. W. Smith and associates and has established its tool, die and metal products manufacturing plant at 3233 Humboldt street.

OREGON

PORTLAND, OREG.—O. J. Lougheed & Son, 303 Union avenue, dealer in saws and conveyor equipment, plans construction of $75,000 plant at Sixtieth and NE Lombard streets, 100 x 200 feet. Chet Spiering is engineer.

WASHINGTON

SEATTLE—Ravenna Metal Products Co., 6518 Ravenna boulevard, will build a machine shop 40 x 94 feet, to cost about $8000.

SEATTLE—Olympic Foundry Co., 5012 Airport Way, will build a pattern storage building 35 x 100 feet.

SUNNYSIDE, WASH.—H. K. Stone, city clerk, is considering bids for a proposed municipal disposal plant to cost about $150,000. G. D. Hall, Yakima, Wash., is engineer.

YAKIMA, WASH. — Redmon - Fairchild Co. plans a concrete construction warehouse with steel girders, 50 x 150 feet.

YAKIMA, WASH.—McIlwanie Machine Works, 11 South Seventh avenue, has let contract to P. Strom for an $8000 assembly plant.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Bell Aircraft Corp., Buffalo, $50,000 increase in contract to provide additional equipment at a plant at Burlington, Vt., making overall commitment $2,650,000.

General Malleable Corp., Waukesha, Wis., $40,000 increase in contract to provide additional equipment at a plant in Waukesha, making overall commitment $935,000.

Pullman Co., Chicago, $20 million for acquisition of troop sleepers and kitchen cars for Office of Defense Transportation for movement of European troops to Pacific ports.

Buckingham Transportation Co., Rapid City, S. Dak., $80,000 to provide truck transportation equipment for Office of Defense Transportation.

Hughes Transportation Inc., Charleston, S. C., $90,000 for truck transportation equipment for Office of Defense Transportation.

Nielsen & Peterson, Grand Island, Nebr., $35,000 for truck transportation equipment for Office of Defense Transportation.

Ankan Film Co. Inc., Newton, N. J., $425,000 to provide plant facilities at Newton, for production of photographic paper and film.

American Viscose Corp., Wilmington, Del., producer of high tenacity rayon yarn, $800,000 to provide equipment at a plant at Marcus Hook, Pa.; increase of $750,000 on contract to provide additional equipment at Lewistown, Pa., to total commitment of $3,400,000; increase of $360,000 on contract for additional equipment at Parkersburg, W. Va., to total commitment of $2,600,000.

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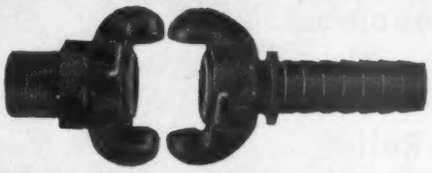

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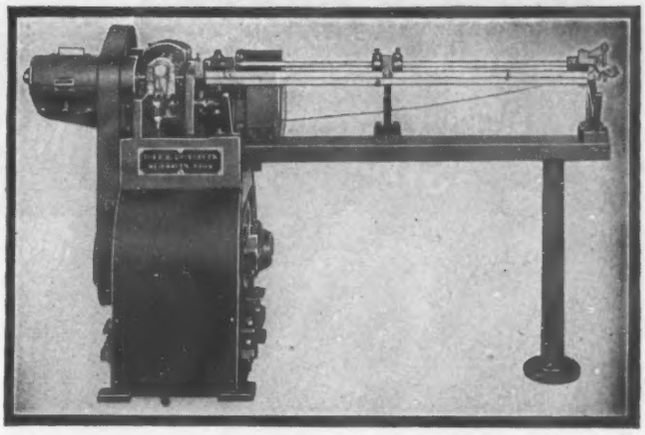

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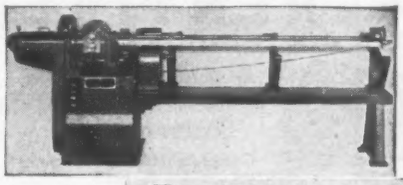
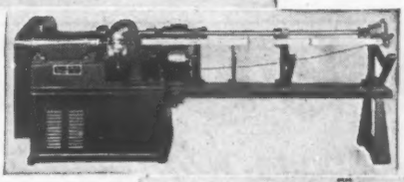
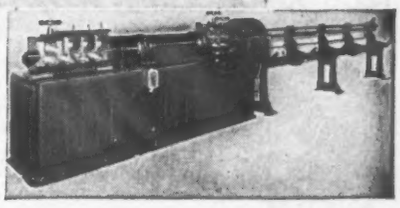


Type 1A
1/16"—3/16"
Dia.



Type 2A
1/8"—1/4"
Dia.

Type 3A
3/16"—3/8" Dia.
Type 4A (not shown)
3/8"—5/8" Dia.



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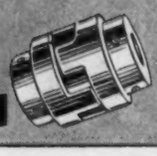

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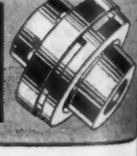

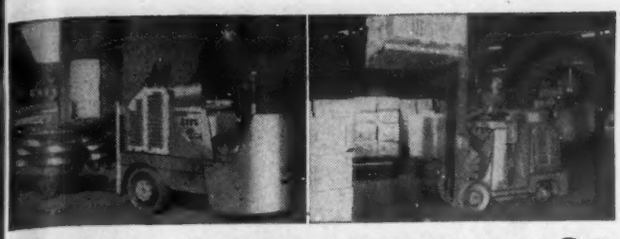

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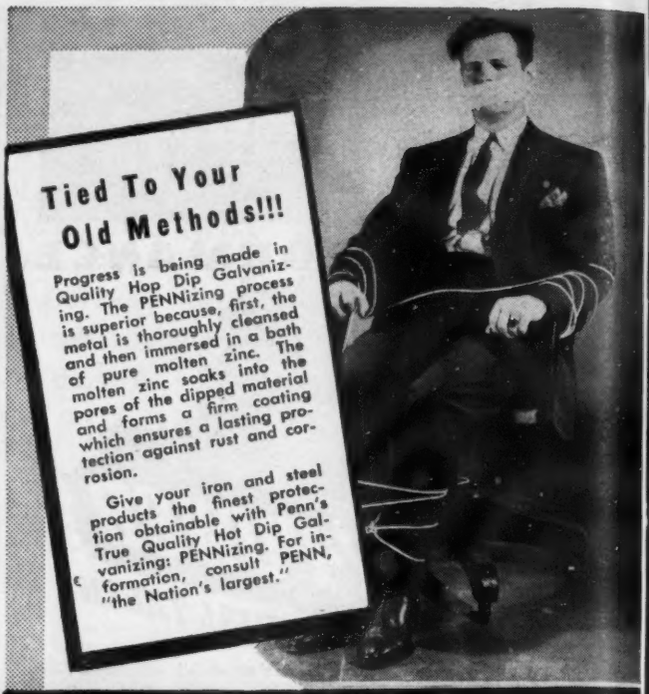

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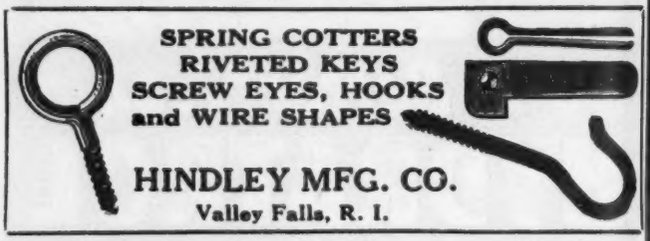

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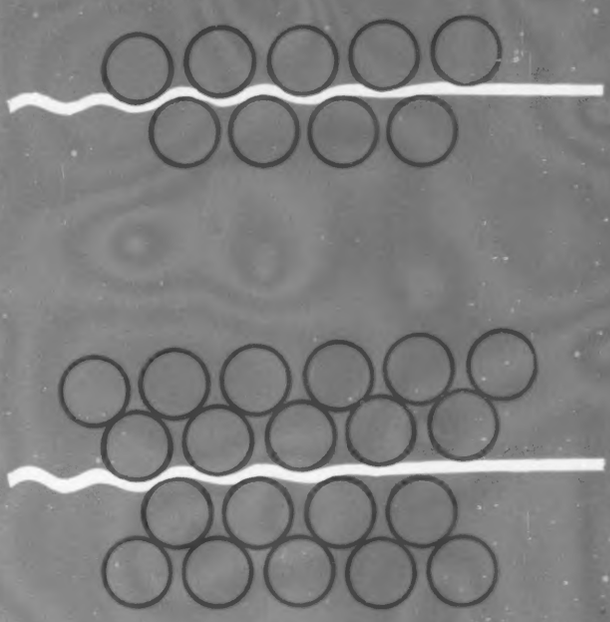
Performance Record by AETNA-STANDARD on LEVELLERS

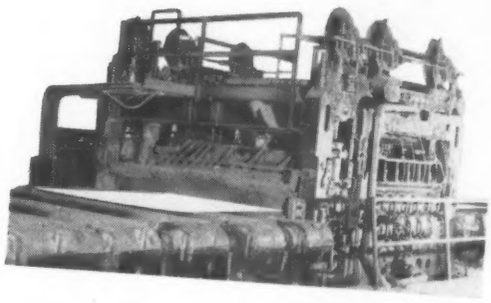
Aetna-Standard can manufacture any size or type of 2-high or 4-high leveller for any weight or type of ferrous and non-ferrous material.

1¾″	diameter	rolls	x 41″ to 60″ wide, Backed up
2½″	″	″	x 54″ to 102″ wide, Backed up
2⅞″	″	″	x 36″ to 48″ wide, Two high
3½″	″	″	x 54″ to 102″ wide, Backed up
3¾″	″	″	x 48″ to 72″ wide, Two high
4½″	″	″	x 48″ to 72″ wide, Two high
4½″	″	″	x 60″ to 90″ wide, Backed up
5¼″	″	″	x 54″ to 90″ wide, Two high
7″	″	″	x 60″ to 84″ wide, Two high
9″	″	″	x 72″ to 110″ wide, Two high
12″	″	″	x 140″ wide, Two high
14″	″	″	x 110″ wide, Two high
18″	″	″	x 140″ wide, Two high



Several factors influence the selection of a 2-high or 4-high leveller . . . size of material, kind of material, how material is to be processed, capacity and future requirements.

Aetna-Standard engineers, experienced in all types of mills and mill equipment, can give you many profitable tips. They have designed and installed many hundreds of levellers for both ferrous and non-ferrous production.



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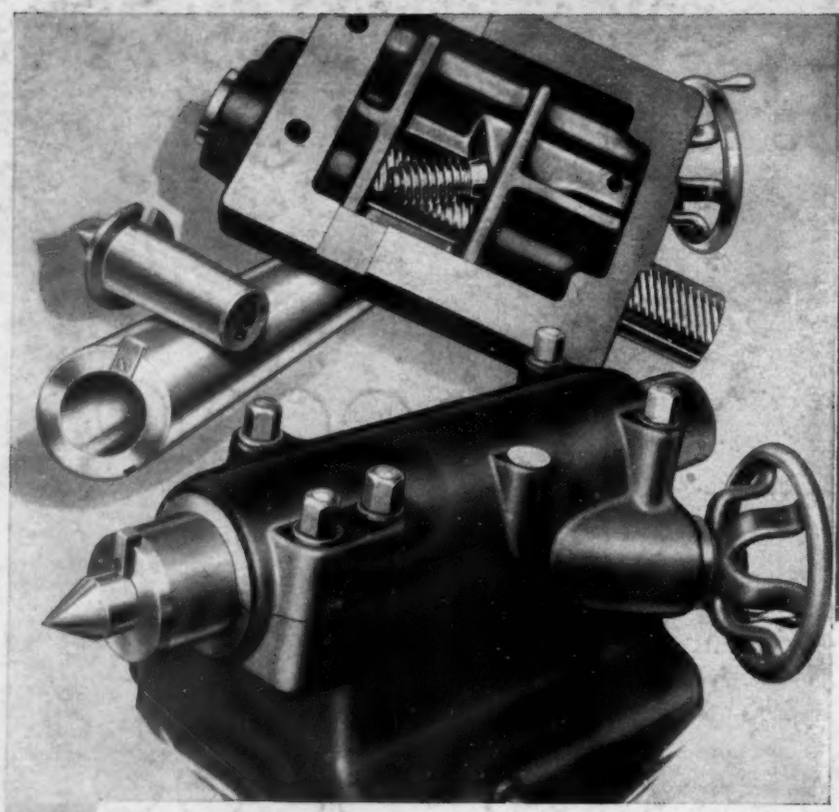

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